

REPORT

OF THE

DEPARTMENT OF THE NAVAL SERVICE

FOR THE

FISCAL YEAR ENDING 31ST MARCH, 1912

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

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EXCELLENT MAJESTY

1912

[No. 38—1913.]

To His Royal Highness, Field Marshall, Prince Arthur William Patrick Albert, Duke of Connaught and Strathearn, K.G., K.T., K.P., &c., &c., &c., Governor General and Commander-in-Chief of the Dominion of Canada.

MAY IT PLEASE YOUR ROYAL HIGHNESS:

I have the honour to submit herewith for the information of Your Royal Highness and the Parliament of Canada, the Second Annual Report of the Department of the Naval Service, being for the year ended March 31, 1912.

I have the honour to be,

Your Royal Highness's most obedient servant,

JOHN DOUGLAS HAZEN,
Minister of the Naval Service.

REPORT
OF THE
DEPARTMENT OF THE NAVAL SERVICE
FOR THE
FISCAL YEAR ENDED MARCH 31
1912

OTTAWA, June 1, 1912.

The Honourable J. D. HAZEN,
Minister of the Naval Service,
Ottawa.

SIR,—I have the honour to report on the Department of the Naval Service for the year ending March 31, 1912, under the following headings:—

1. Naval.
2. Fishery Protection.
3. Tidal and Current Survey.
4. Hydrographic Survey.
5. Wireless Telegraph.

1. NAVAL BRANCH.

The training of Cadets at the Naval College has proved very satisfactory, marked progress being shown.

I regret to report that one of the most promising Cadets, H. Raymond B. Yates, died on April 14, 1911, of Endocarditis, following an attack of measles.

In November, 1911, an examination was held for the entry of Cadets, and eleven qualified, of whom ten joined the College in January.

Further additions have been made to the instructional machinery and the Cadets are provided with a thorough course of practical training in engineering.

The schooner *Advocate* has been purchased and is being fitted out for the practical instruction of the Cadets in seamanship.

Through the courtesy of the British Admiralty the six Midshipmen who were serving in *Niobe* have been accepted for training in Imperial Ships, and are now

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serving with their Naval Instructor in H.M.S. *Dreadnought*; the six Engineer Sub-Lieutenants have also been accepted for training, and have been distributed amongst Ships of the Home and Atlantic Fleets. Excellent reports have been received of the progress of these Officers.

Owing to the uncertainty of the future Naval policy, and the limited accommodation available, no special efforts have been made to obtain recruits for the Navy; eligible candidates presenting themselves to the various Postmasters detailed as Recruiting Officers, were entered and sent to the *Niobe* and *Rainbow* for training, the total number of recruits entered during the year being 126. The total number entered since recruiting first started is 349. 111 recruits and 38 others deserted during the year; the large number of desertions is attributable to the fact that the greater number of recruits are entered from places remote from the sea, and find sea life distasteful.

A naval contingent consisting of 3 Officers and 35 men was sent to England to attend the Coronation of His Majesty the King; the contingent was stationed outside Buckingham Palace along the route of the Coronation procession; the appearance of the contingent was most favourably commented on.

During the spring and early summer the *Niobe* cruised around the coast of Nova Scotia and Gulf of St. Lawrence and also visited Quebec. Unfortunately whilst proceeding from Yarmouth to Shelburne on July 30 the Ship grounded on the South West Ledge off Cape Sable, and suffered severe damage.

She was eventually towed into Halifax by H.M.S. *Cornwall*, which latter ship also grounded on an uncharted rock when proceeding into Clark's Harbour to render assistance to *Niobe*.

Through the courtesy of the British Admiralty, who sent the Fourth Cruiser Squadron to Halifax for the purpose, Courts Martial were held on the Commanding Officer, the Navigating Officer and Officer of the Watch. The Commanding Officer was acquitted, the Navigating Officer was severely reprimanded and dismissed his ship, and the Officer of the Watch was reprimanded.

The behaviour of the crew, which included a large number of recruits, was the subject of most favourable comment on the part of the President and Officers composing the Court.

Owing to the urgency of completing repairs to H.M.S. *Cornwall*, it was only possible to carry out immediate temporary repairs to *Niobe*; on March 19, however, she was docked for complete repairs, which are expected to be completed in July.

The *Rainbow* has made various cruises during the year on the Pacific Coast for the training of Recruits and to assist in Fishery Protection. In February the U.S. fishing schooner *Edrie* was captured for illegal fishing, and was condemned by the Courts.

The health of the Navy has been, on the whole, satisfactory; diseases due to exposure to cold and climatic changes have been somewhat prevalent in the *Niobe* and are accounted for by the fact that a large number of the men on board are Pensioners from the Imperial Service, whose age renders them more liable to chest complaints.

The report of the Director of the Naval Service on the Naval Branch is appended at page 17.

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NAVAL BRANCH—DOCKYARDS.

DOCKYARD WORK AND ORGANIZATION, &c.

The administration of the Dockyards at Halifax and Esquimalt has been taken over by the Naval Service, observing that for the present certain Stores Buildings at Halifax, not immediately required, have been loaned for the use of the Marine and Fisheries Department until such time as they may be required for Naval use. The workshops at Halifax are entirely under the Naval Service; the work and repairs carried out being those which are incidental to the upkeep of *Niobe*, the vessels of the Fishery Protection Service, Hydrographic Survey, Tidal Survey, and the Naval Establishment generally. Arrangements have been made with the Departments of Militia, and Marine and Fisheries to undertake, on requisition, and repayment, any work to vessels, &c., belonging to these Departments. These arrangements have been made with a view of providing constant employment to the men employed and to obviate periodic discharges if possible.

The wages paid to the various trades have been recently under revision, and a more satisfactory system has been adopted introducing an hourly rate and a 50-hour week, the rates being based on those of the Fair Wage Schedule of the Labour Department, taking into consideration the relative importance of the trades in a Dockyard Establishment, which it should be noted, is primarily designed to carry out the special work of repairing ships.

The following is a summary of the principal items of work which have been undertaken at the Dockyards during the financial year 1911-12.

HALIFAX.

The nature of the work done at this Yard during the year, in addition to the repairs and upkeep of the Naval Establishment generally, includes the fitting of a new boiler in C.G.S. *Curlew* and the repair and refit of the vessel generally, which was carried out in September and October last.

The grounding of H.M.C.S. *Niobe* rendered temporary repairs to the sheathing of the vessel in order to admit of H.M.S. *Cornwall* being placed in dock; this work was carried out by the Dockyard Staff in the Halifax Graving Dock. Certain items required by *Cornwall* were also carried out during the period she was in the dock.

The winter refits and necessary repairs of the *Canada*, *Constance* and *Curlew* were carried out by the Yard Staff during the period they were laid up.

Repairs have been carried out for the Hydrographic Survey vessels, *Burleigh*, *Chrissie Thomey*, and the boats used by this Branch, and the defects of the Tidal Survey Ship *Gulnare* have also been undertaken.

Electrical work in connection with the Yard installation and fittings and repairs to the dynamos and armatures of *Niobe* have been carried out. Large repairs have been effected to the Stores and Coal Sheds and other necessary work incidental to upkeep of buildings.

Various items of work have been carried out from time to time during the year for the Marine and Fisheries Department in connection with the vessels under that Service. Some boats have also been constructed for the Naval College and Yard purposes.

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ESQUIMALT.

Repairs and upkeep of buildings and plant, custody and issue of stores to *Rainbow* and the Imperial Ships on that Station. The annual refit of H.M. Ships *Algerine* and *Shearwater* was carried out by the Dockyard during the months of June and July; additional men being entered temporarily as found necessary to supplement the staff. A refit of H.M.C.S. *Rainbow* was also carried out in a similar manner. Further repairs were carried out in October to *Algerine*, *Shearwater*, and C.G.S. *Falcon* and *Restless*. A refit of the Hydrographic Survey Steamer *Lillooet* was also carried out during the months of February and March last. Considerable economy has resulted from the making good of the defects of the vessels enumerated in the Government Dockyard, and it is desirable that the facilities available should be utilized to the fullest extent. The docking of these vessels was carried out in the Esquimalt dock and the incidental work in connection with examination of underwater fittings was also carried out by the Dockyard and Ship's Staff.

REORGANIZATION OF THE ESTABLISHMENTS.

Having regard to the fact that the future Naval policy of the Government has not been definitely laid down, it has been thought desirable not to enter into any large expenditure for reorganization of the machinery and plant at the Yards until such time as the requirements which may be necessary in the future for repairs to ships are definitely known.

Since the machinery and plant at the Dockyards was installed by the Admiralty, entirely new developments have taken place in Engineering, resulting in the introduction of turbine machinery for propulsion in practically all new warships, together with the adoption of the water tube boiler for generating steam in the majority of these vessels.

In order to ascertain what will be required, an examination and report on the plant at Halifax has been made in detail by the Consulting Naval Engineer, and it is found that in order to cope with repairs to modern ships complete reorganization is necessary, the plant and workshops being entirely inadequate to deal with such work.

Proposals have been made for the reorganization of the Establishment at Halifax from a repair point of view, but pending a decision on the Naval policy the details of the proposals have not been considered.

The plant and buildings at Esquimalt Yard are somewhat more modern, but in order to undertake repairs to modern machinery of the nature previously indicated considerable modifications and expenditure will be necessary at that Establishment.

In the meantime, these Establishments are being maintained in accordance with the conditions under which they were transferred to the Dominion Government.

In order to justify the expenditure on these establishments, provided for in the Naval Estimates, it will be as well to review the most important of these conditions which are as follows:—

The Admiralty give the Dominion Government absolute latitude in dealing with the property providing:—

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(1) That in the case of Halifax and Esquimalt, if the Dominion Government fail to maintain the existing property in a state of efficiency, or make any alterations to the buildings, walls, jetties, &c., or in the present use of sites, or if they fail to maintain the existing depth of water alongside the frontage of Admiralty property, then conveniences at least quite equal in character to those which exist at present, should be provided at the same port.

The Admiralty still require to stock coal at Halifax and Esquimalt for the use of H.M. Ships, and the Dominion Government should undertake to arrange for this in a suitable manner and to allow their local representative to take charge of it.

(2) That the facilities required should be given to H.M. Navy whenever wanted, at any Government Establishments which the Dominion may now or in future be possessed of, such facilities with the exception of labour and materials to be given free of cost.

(3) That the Admiralty shall be informed beforehand of any proposal contemplated by the Dominion Government to use the property transferred at Halifax and Esquimalt for other than Naval and Military purposes.

(4) The Dominion Government undertook existing and future liabilities in addition to other minor conditions and the payments of the Admiralty Dock Subsidy to the Halifax Dock Co. which then remained to be paid.

Having regard to these conditions and also the fact that the buildings and plant at these Dockyards are many years old, it will be readily understood that considerable expenditure has been necessary to bring them to what may be considered an efficient state to comply with these Admiralty conditions of transfer and enable ordinary repairs to be executed. At the present time this desirability has been reached, but it cannot be stated that the Establishments are efficient for coping with repairs to the most modern warships for the reasons previously indicated.

In addition to the expenditure on workshops and plant, consideration has been given to the adaptation and repair of the existing storehouses to meet the Naval requirements of the Government. Although the total requirements of stores are not large when compared with those in the Imperial Yards, the large variety is similar, and special storage arrangements are necessary to provide for efficient maintenance of stores in stock, and to enable issue and return of stores to be readily arranged for. This question has been considered in detail during the past year and repairs and alterations made to enable the matter to be dealt with efficiently. The upkeep of the wharves and jetties, &c., is being maintained as transferred.

The coal storage arrangements have also been considered in detail and repairs and provision for additional stowage for the Canadian Government Vessels has been made with due economy, having regard to the condition of transfer and the present requirements of the Canadian Government.

The provision of special coaling appliances has also received due consideration but the matter has been deferred pending a decision on the future policy to be adopted.

Having regard to the fact that the value of the plant and stores at these Yards is now considerable, the adequacy of the fire arrangements has been under consideration, and the necessary steps have been taken to provide for the various contingencies

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which may arise in order to prevent or minimize the damage which would result in the event of fire.

The general administration of the Dockyard has been perfected on the lines of the Imperial Yards, and is working satisfactorily. The heads of the various departments for Engineering repairs, hull repairs, stores, accounting, &c., are responsible for the efficient performance of the work of their particular employees to the Captain in Charge, who has been given a limited financial control to enable urgent repairs to be put in hand. The General administration and complete financial control of expenditure, however, together with approval of all items involving large expenditures, rests with the Department at Ottawa.

Various instructions have been issued with a view of maintaining the discipline which is absolutely necessary in establishments of this nature, and the guarding of the entrances, &c., is now being carried out by a detachment of the Dominion Police with a view to preventing irregularities.

2. FISHERY PROTECTION SERVICE.

The following vessels were employed on Fishery Protection Service in the districts named during the year:—

Canada.—East Coast of Nova Scotia and Gulf of St. Lawrence.

Petrel, Constance.—East Coast of Nova Scotia.

Curlew.—Bay of Fundy.

Vigilant.—Great Lakes.

Kestrel, William Jolliffe, Restless, Falcon.—Pacific Coast.

Continual cruises were maintained by these vessels during the fishing seasons in the interests of Fishery protection; the *Kestrel* was only employed during a portion of the year, being condemned as unfit for further service, and was replaced temporarily by the SS. *William Jolliffe* which was chartered for the purpose.

Cod fishing off the south shore of Nova Scotia is reported as having been very successful, beating all previous years; the lobster catch was fairly successful, but the fall mackerel catch was a total failure. The eastern part of the coast fishing was only fair, the fishing being much interfered with owing to storms.

Very little illegal fishing was met with.

Fishing in the Bay of Fundy was not satisfactory owing to the prevalence of fog and bad weather.

Similar conditions prevailed on the Great Lakes with the result that very few fishermen were operating.

There was considerable poaching on the British Columbia Coast and at various times the *Sebastian, Grant* and *Germania* were chartered to assist in protection duties.

One United States vessel, the *Scara*, was captured by the *William Jolliffe*, and was condemned by the Courts for illegal fishing.

The report of Rear Admiral C. E. Kingsmill on the Fishery Protection Service is appended at page 24.

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3. TIDAL AND CURRENT SURVEY.

The work of the Tidal and Current Survey was continued during the year by means of the Tidal Stations on both coasts and also on board the C.G.S. *Gulnare* operating in the Gulf of St. Lawrence.

Valuable information was obtained which has been embodied in the Tide Tables which are published annually; the circulation of these tide tables is increasing annually, not only amongst shipping companies, but also amongst fishing and various industries operating on the coast, such as saw mills, canneries, whaling establishments, &c.

The report from Doctor Bell Dawson, Superintendent of the Tidal and Current Survey is appended at page 33.

4. HYDROGRAPHIC SURVEY.

The Hydrographic Survey work, in charge of Mr. W. J. Stewart, Chief Hydrographer, continued to make satisfactory progress during the year under the following divisions:—

1. Lake Ontario.
2. Lower St. Lawrence.
3. Pacific Coast.
4. St. Lawrence River at Lachine Rapids.
5. Hudson Bay.

The work in Lake Ontario was in charge of Mr. A. Bachand who conducted the survey from the steamer *Bayfield*. Plans on large scales were made of Cobourg Harbour and Port Hope, and other useful work carried out.

The work in the Lower St. Lawrence was carried out by Commander Irving Miles, operating from the steamer *Cartier*; triangulations, traversing and sounding were carried out in the neighbourhood of Bic Island and Father Point.

The survey on the Pacific Coast is in charge of Captain P. C. Musgrave, being conducted from the steamer *Lillooet*. Further progress was made in the survey around Prince Rupert, and a new plan of Skidegate Inlet was proposed, and much useful work carried out in other directions.

A small party under Mr. Charles McGreevy was employed revising some work in Lake St. Francis and Cedars Rapids, and later moved to LaPrairie in order to connect the Hydrographic Survey work in Lake St. Louis with that in Montreal Harbour.

Three parties were sent to Hudson Bay, viz.: one in the *Minto* under Captain Frederick Anderson, a second under Mr. H. D. Parizeau, operating from the schooner *Chrissie Thomey*, and a third in the schooner *Burleigh*, this latter party being equipped for the purpose of securing reliable data concerning the magnetic declination in Hudson Bay and Strait.

The survey of Port Nelson was completed and the Department has the chart in course of preparation.

From the data obtained it is seen that Churchill Harbour affords perfect protection for a small number of deep draught vessels; that the land adjoining the approaches

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is bold and easily picked up from a convenient distance. The water is deep in the approaches and there are no outlying dangers. A vessel can easily make the entrance to the harbour, which is well defined, and can enter without difficulty.

The approach to Port Nelson is over long mud flats which extend far from the land which is low and cannot be seen from the entrance to the channel. There is a large outlying shoal which constitutes a danger to approaching vessels. To make the harbour safe for navigation would require buoys and other marks, and there would probably be difficulty in maintaining these during part of the season owing to floating ice in the bay and in the river.

A very complete report of these expeditions is contained in the report of Mr. Stewart, Chief Hydrographer, which is appended at page 41.

During the season the following new charts were issued:—

Presqu'île Bay.
Cove Island to Duck Island.
Bic Island to White Island.
South Traverse (St. Lawrence River).
Churchill Harbour.

Also a second edition of the following charts:—

Berens River to Nelson River (Lake Winnipeg).
Red River to Berens River (Lake Winnipeg).
Goderich Harbour.
Montreal Harbour.
Portneuf to Cape Santé.
Ste. Croix to St. Antoine.

5. WIRELESS TELEGRAPH.

No new stations have been opened during the year.

The total number of stations owned by the Government is as follows:—

On West Coast..	9
On East Coast..	10
On Great Lakes..	1

The Stations on the West Coast are operated by the Government, those on the East Coast and Great Lakes by the Marconi Wireless Telegraph Company under contract with the Government.

The range of these stations varies from 100 to 400 miles.

In addition to the above the Marconi Company owns and operates stations at Glace Bay (range 3,000 miles), Camperdown (250 miles), Sable Island (300 miles), Pictou (100 miles) and North Sydney (100 miles).

Three commercial licenses have been issued for stations with a range of from 30 to 50 miles, and licenses for 11 experimental stations with a range of 15 miles.

The messages handled during the year by the Coast Stations show a satisfactory increase, as shown in the following list:—

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	Number of messages.		Number of words.	
	1910-1911.	1911-1912.	1910-1911.	1911-1912.
East Coast..	71,594	119,049	1,179,434	1,824,450
West Coast..	48,074	76,158	647,461	997,900
Great Lakes.. . . . .	.....	1,043	.....	17,095

Twelve Government vessels are equipped with wireless, and licenses have been issued to 26 merchant vessels.

The construction of a chain of stations on the Great Lakes is now in progress; the station at Port Arthur has been purchased from the Marconi Wireless Telegraph Company, and work has been commenced on the erection of three new stations at Sault Ste. Marie, Tobermory and Midland, Ontario; it is anticipated that these stations will be operating during the Navigation season 1912.

Further stations will be erected at or in the vicinity of Kingston, Toronto, Port Colborne, Port Stanley and Sarnia.

The International Radio-Telegraph Convention will be held in London, England, in 1912, which will be attended by representatives from the Department.

The report of Mr. C. P. Edwards, Superintendent of the Radio-telegraphic Service is appended at page 58.

I have much pleasure in expressing my satisfaction at the efficient way in which the Officers and Clerks of the Department have carried out their duties during the year.

I have the honour to be, sir,

Your obedient servant,

G. J. DESBARATS,

Deputy Minister of the Naval Service.

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STATEMENT of Revenue of Department of the Naval Service for Fiscal Year ended
March 31, 1912.

Royal Naval College—

College fees, 29 cadets.. . . . \$2,900 00

Less refund Dr. H. R. Yates.. . . . 250 05

\$2,649 95

Wireless Apparatus Licenses.. . . . 30 00

Casual Revenue.. . . . 1,880 97

Miscellaneous Revenue:—

Purchase of Discharges.. . . . 1,180 00

Cape Lazo Station.. . . . 310 51

Estevan Station.. . . . 701 12

Dead Tree Point Station.. . . . 173 79

Ikeda Station.. . . . 106 55

Magdalen Islands Station.. . . . 229 57

Pachena Station.. . . . 35 11

Point Grey Station.. . . . 298 04

Prince Rupert Station.. . . . 537 93

Triangle Island Station.. . . . 163 47

Victoria Station.. . . . 2,158 25

4,714 34

Total.. . . . \$10,455 26

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FINANCIAL STATEMENT FOR THE FISCAL YEAR 1911-12.

Naval Service—

Appropriation..	\$3,000,000 00
Expenditure..	1,233,456 08

Expenditure less than appropriation.. . .	\$1,766,543 92
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Fisheries Protection Service—

Appropriation..	\$281,500 00
Expenditure..	227,312 35

Expenditure less than appropriation .. .	\$ 54,187 65
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Hydrographic Surveys—

Appropriation..	\$320,000 00
Expenditure..	198,558 99

Expenditure less than appropriation .. .	\$121,441 01
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Radiotelegraphic Service—

Appropriation..	\$255,000 00
Expenditure..	210,882 82

Expenditure less than appropriation .. .	\$ 44,117 18
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Tidal Service—

Appropriation..	\$ 45,000 00
Expenditure..	31,211 78

Expenditure less than appropriation .. .	\$ 13,788 22
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New Fisheries Protection Steamer—

Appropriation..	\$ 75,000 00
Expenditure..	72 16

Expenditure less than appropriation .. .	\$ 74,927 84
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Civil Government—

Appropriation..	\$ 85,400 00
Expenditure..	66,967 39

Expenditure less than appropriation .. .	\$ 18,432 61
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Contingencies—

Appropriation..	\$ 20,000 00
Expenditure..	19,143 36

Expenditure less than appropriation .. .	\$ 856 64
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SUMMARY.

Grand total appropriation..	4,081,900 00
Grand total expenditure..	1,987,604 93

Grand total expenditure less than appropriation..	\$2,094,295 07
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REPORT OF THE MILITARY BRANCH.

OTTAWA, April 1, 1912.

The Deputy Minister,
Department of the Naval Service,
Ottawa.

SIR,—I have the honour to forward herewith the Annual Report of the Military Branch of the Department of the Naval Service for the year ending March 31, 1912.

ROYAL NAVAL COLLEGE.

The course of training at the College has proved very satisfactory and the Cadets have made marked progress. As a result of the examination held at the end of the first year, one Cadet showed unsatisfactory progress and was withdrawn by his parents.

I regret that one of the most promising Cadets, H. Raymond B. Yates, died on April 14, 1911, of Endocarditis, following an attack of measles.

In November, 1911, an examination was held for the entry of Cadets, and 11 qualified, of whom ten joined the College in January.

As a result of the course of physical training at the College the 19 Cadets belonging to the first entry showed the following average increase in physical development:—

Height, $1\frac{1}{4}$ inches; weight, 15 lbs.; chest measurement, $2\frac{1}{8}$ inches.

All the Cadets display great keenness in the profession which they propose to adopt, prove very smart in boatwork, and show marked ability in engineering.

Further additions have been made to the instructional machinery and with the advent of an increased number of Cadets, another Engineer Officer has been added to the complement of the College; a thorough course of practical training in Engineering is being provided, and the Cadets have turned out very creditable work in the manufacture of parts of gun mountings, &c.

A trained nurse has been obtained for the Sick Quarters attached to the College, but, with the exception of the death already recorded, the health of the Cadets has been very satisfactory, only minor ailments having developed.

The schooner *Advocate* has been purchased and, having had necessary alterations made, will be available during the coming summer for the practical training of the Cadets in seamanship.

An asphalt tennis court has been laid in the Dockyard for the Cadets' recreation and is available in the winter for use as a skating rink.

ENGINEER SUB-LIEUTENANTS AND MIDSHIPMEN.

Through the courtesy of the British Admiralty the six Midshipmen trained in *Canada* who were serving in *Niobe* have been accepted for training in Imperial Ships; and have been appointed, with their Naval Instructor, to H.M.S. *Dreadnought* serving in the Home Fleet. The Captain of *Dreadnought* reports most favourably on these Officers.

The six Engineer Sub-Lieutenants were also accepted and have been distributed amongst Ships of the Home and Atlantic Fleets. Excellent reports have been received from their Commanding Officers of their progress.

RECRUITING.

Owing to the uncertainty of the future Naval Policy, and to the accommodation being limited, no special efforts have been made to obtain recruits; Postmasters are still acting as recruiting officers and have forwarded candidates who come up to the standard of physical and educational requirements.

The number of recruits entered during the year and the provinces from which they come are as follows:—

	' Niobe.'	' Rainbow.'
Nova Scotia..	37	..
New Brunswick..	2	..
Prince Edward Island..	8	..
Quebec..	11	..
Ontario..	52	..
Manitoba..	1	..
Saskatchewan.. . . . .	..	1
Alberta.. . . . .	..	3
British Columbia.. . . . .	..	11
Total..	111	15

The total number of recruits entered since recruiting first started is:—
Niobe, 296. *Rainbow*, 53.

The following desertions are recorded during the year:—

	Recruits.	Others.
From H.M.C.S. <i>Niobe</i>	86	17
From H.M.C.S. <i>Rainbow</i>	25	21

The large number of desertions is attributed to the fact that the larger number of recruits are drawn from cities and towns remote from the sea; candidates present themselves who are totally unacquainted with the conditions of life in a ship, which differ much from that to which they are accustomed. Up to the present the fishing population has not been exploited, and it is anticipated that recruits can be obtained therefrom who are inured to a sea life and who would find themselves in congenial surroundings in a Man of War.

MOVEMENTS OF SHIPS.

H.M.C.S. *Niobe*.

During the Spring and Summer the *Niobe* cruised around the coast of Nova Scotia and the Gulf of St. Lawrence carrying out the Gunnery exercises and the training of recruits. On June 1 she arrived at Quebec and embarked a contingent consisting of 1 Lieutenant in Charge, 2 Midshipmen and 35 men in the SS. *Corsican* for passage to England to attend the Coronation of His Majesty the King. With the exception of the Officer in Charge and 3 Petty Officers, the whole of the contingent consisted of Canadian recruits. The contingent was stationed outside Buckingham Palace along the route of the Coronation procession. They were also at Portsmouth for some time, being present at the Naval Review, and were also given an opportunity of visiting the Dockyard and H.M. Ships. The appearance of the Contingent was most favourably commented on. The Ship returned to Quebec on July 13 to reembark the contingent, which returned in the SS. *Victorian*, and then proceeded on a cruise round the coast of Nova Scotia.

At 12.19 a.m. July 30, whilst on passage from Yarmouth to Shelburne, the Ship grounded on the S.W. Ledge off Cape Sable. The Ship remained on shore nearly two hours, eventually being got off by working the engines, being assisted by the strong tide running.

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It was realized that the Ship had been badly damaged; some of the propeller blades were broken and the rudder completely torn off. Much difficulty was thus experienced in moving her, but, under the escort of three tugs, she proceeded under her own steam to Clark's Harbour where she was safely anchored at 6.45 p.m.

The perilous condition of the *Niobe* having been communicated by wireless, the Government Steamers *Lady Laurier* and *Stanley* were sent to her assistance; it was realized that it would be necessary to tow the Ship to Halifax, and, the Government Steamers not being sufficiently powerful for the task, an offer of assistance from H.M.S. *Cornwall*, which Ship had received news of the occurrence, was gratefully accepted.

The *Cornwall* arrived off Clark's Harbour in a dense fog on August 5, and unfortunately, whilst feeling her way in to the *Niobe*, grounded on a rock, which proved to be uncharted and which has since been located.

On August 7 the *Cornwall* took the *Niobe* in tow and arrived at Halifax on August 8, dense fog having been experienced throughout the passage.

The *Cornwall* was docked first for examination and it was found necessary to obtain the services of a Constructor from England to supervise repairs. Pending his arrival the *Niobe* was docked and temporary repairs effected, after which the *Cornwall* was again docked to complete repairs to enable her to proceed to England. Her repairs were completed on October 29 and, owing to the inconvenience which would arise from the Ship being in dock during the winter with her crew on board, the repairs to *Niobe* were deferred until the Spring. The *Niobe* went into dock on March 19, 1912, and her repairs are expected to be completed in July.

Through the courtesy of the British Admiralty, who sent the Fourth Cruiser Squadron to Halifax for the purpose, Courts Martial were held on the Commanding Officer of *Niobe*, the Navigating Officer and the Officer of the Watch for suffering ship to be stranded. The Courts sat from November 15 to 18 and the findings and sentences were as follows:—

Commanding Officer. Acquitted.

Navigating Officer. Severely reprimanded and dismissed his ship.

Officer of the Watch. Reprimanded.

The Court commented most favourably on the behaviour of the crew of the Ship under the most trying circumstances, more especially in view of the fact that there were many recruits on board, and the following letter was forwarded by the President to the Rear-Admiral Commanding the Fourth Cruiser Squadron:—

'SIR,—I have the honour to report that on behalf of the Members of the Courts Martial sitting for the trials of Officers of H.M.C.S. *Niobe* from November 15 to 18, we wish to draw the attention of the Canadian Naval Administration to the exemplary behaviour of the Ship's Company in H.M.C.S. *Niobe* on the occasion of the stranding, both on deck and in the engine room under most trying circumstances.

It is noticeable especially that no less than 180 recruits were on board, all boys or youths, and their conduct on this occasion appears to be most creditable.

The Court are also of opinion that the seamanship displayed by Commander Macdonald, his Officers, and men in moving the disabled ship under trying circumstances into Clark's Harbour is worthy of all praise.

I have, &c.,

L. CLINTON-BAKER.

Captain H.M.S. *Berwick*,

President of Court Martial.

During the month of June the *Niobe* carried out various gunnery exercises and also the Annual Gunlayers' Test in Northumberland Straits, the results being satisfactory. The Annual Musketry Course was carried out at the Rifle Range on McNab's Island at Halifax.

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H.M.C.S. *Rainbow*.

During May and June the *Rainbow* proceeded on a cruise, visiting the following places:—Nanaimo, Comox and Vancouver, returning to Esquimalt on June 23.

Whilst at Comox Gunnery Exercises were carried out and also the Annual Gunlayers' Test, the results being satisfactory.

On June 30 the Ship proceeded to Vancouver to attend the Dominion Day festivities, returning to Esquimalt on July 4.

On August 27 proceeded to Vancouver and from thence to Comox where the Annual Musketry Course was carried out and also long range firing with heavy guns. On completion of the course Ship proceeded to Prince Rupert, returning to Esquimalt on October 16.

On October 17 the Ship was docked.

Left Esquimalt on November 27 visiting Saltspring Island and Vancouver, returning to Esquimalt December 7.

Left Esquimalt January 29 and visited Cowichan Bay, Pender Island, Ganges Harbour, Vancouver, Union Bay, Alert Bay and Knight Inlet, returning to Esquimalt February 29.

During the various cruises opportunity was taken to visit the fishing grounds, but no infractions of the law were discovered.

The ship's draught prevents her from cruising in unsurveyed waters or from entering harbours frequented by the fishing fleet.

The U.S. fishing schooner *Edrie* which was captured by the *Rainbow* in February, 1911, was condemned by the Courts for illegal fishing.

The recruits serving in *Rainbow* have benefited by the cruises and have made satisfactory progress.

HEALTH OF THE ROYAL CANADIAN NAVY.

A separate report by the Principal Medical Officer, H.M.C.S. *Niobe*, showing the health of the Royal Canadian Navy for the year 1911-12 is attached.

I have the honour to be, sir,

Your obedient servant,

C. E. KINGSMILL,

Rear Admiral, Director of the Naval Service.

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REPORT ON THE HEALTH OF THE ROYAL CANADIAN NAVY.

The Sick returns of His Majesty's Canadian Navy show a total number of 699 sick from all causes who were treated on the 'Sick List' during 1911, with a total of 4,879 days sickness.

Of these 588 were returned fit for duty; 104 were sent to Hospitals ashore for treatment, 13 being invalided out of the Service and 4 died.

Out of these totals H.M.C.S. *Niobe* supplies 550 sick with 3,757 days sickness and H.M.C.S. *Rainbow* has 111 sick with 869 days sickness; the remaining 38 patients who account for 253 days of sickness were from the Royal Naval College during the months of April to December, 1912.

These figures give rise to the following comparison between the Eastern and Western depots of the Navy, not taking into account the cases undergoing treatment in hospitals ashore:—

	'Rainbow'.	'Niobe'.
Average number of days each sick man was under treatment..	7.83	6.82
The Percentage of sick for the Complement borne respectively at each Depot..	58.11	102.79

NOTE.—This shows that the state of health of the various ratings serving in the Western depot is nearly twice as good as that in the Eastern depot.

	'Rainbow.'	'Niobe.'
RESPECTIVE Percentages of the More Prevalent Illness to the Total Number of Reported Sick.		
Diseases due to exposure to cold and climatic changes—(e.g. Influenza, Tonsillitis, Acute chest diseases, &c.)..	15.4%	34%
Rheumatism and fever..	4.5%	6.5%
Gonorrhoea..	0%	8.1%
Abscess and boils..	10.%	5.2%
Injuries..	40.%	13.4%

This table of comparison shows as follows:—

(I) That the diseases due to cold and climatic changes are more than twice as prevalent at the Eastern than at the Western depot.

(II) Rheumatism is more or less common to both stations but 50% more so in the *Niobe* than in the *Rainbow*.

(III) Venereal Disease is very prevalent at Halifax—in spite of all the attempts made to abolish such contagion and infection.

The commonest cause for treatment on the Sick List in *Rainbow* is that of injuries (40% of total causes)—whereas exposure to cold and changes of climate are responsible for the greatest percentage of causes in the *Niobe* (34% of all causes).

In considering the sickness on board the *Niobe* certain factors should be borne in mind from the first:—

1. The average age of the Ship's Company brought out from England is well over 30 years—quite a number of ratings being between 40 and 45 years old—a fact which rendered them more prone to chest complaints.

2. The *Niobe* was alongside at Halifax during the winter months of October, 1910, to April, 1911. The sudden and great changes of temperature which this climate is subject to (sometimes registering in 24 hours a rise and fall of 20°)—the severe winds and frost to which the Ship was exposed and the fact that there is very little opportunity for the men and boys to get regular games and outdoor sports ashore in Halifax, all tended to undermine the physical and mental conditions of the Ship's Company and to produce serious illness on board.

3. There was a number of boys about the ages of 16 and 17 years continually joining as recruits during the early months of the year, and consequently the liability

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to contract infectious diseases on board was always increasing, especially as measles and mumps were prevalent in Halifax at this period. We took stringent precautionary measures to avoid any contagion and spread of infection on board so the cases of illnesses of this nature were comparatively few and never reached the stage of an outbreak.

Between January 25 and April 23 there were 11 cases of Measles.

“ March 20 and June 25 there were 15 cases of Mumps.

“ December 14 and December 31 there were 2 cases of Scarlet Fever.

NOTE.—This would suggest the advisability of moving the ships away from Halifax during the winter months—especially the months of February to May.

13 MEN WERE INVALIDED DURING THE YEAR—9 FROM THE EASTERN DEPOT AND 4 FROM THE WESTERN DEPOT, VIZ.—

Invalided direct from H.M.C.S. 'Niobe'.

Newman Rolfe, aged 19, a Stoker, invalided for Deafness (sequela of Measles) August 30.

Thomas Casterton, aged 30, a Stoker, invalided for Mental Disease, October 26.

James Douglas, aged 42, a Bandsman, invalided for Chronic Eczema, October 26.

Invalided from the Military Hospital at Halifax.

Albert E. Martell, aged 26, a Stoker, invalided with new growth of Clavicle, May 28.

A. Robinson, aged 22, Officer's Cook, 3rd Class, invalided with Phthisis from R.N.C., September 9.

Walter S. Tupper, aged 25, Officer's Steward, R.N.C., invalided with Phthisis, March 2.

Jonathan Doughty, aged 32, Leading Seaman, invalided with Chronic Dyspepsia, March 1.

Frederick Woodcock, aged 24, Ship's Cook, 3rd Class, invalided with Mental Disease, October 26.

Thomas Privett, aged 43, Able Seaman, invalided with Chronic Asthma, October 26.

Invalided direct from H.M.C.S. 'Rainbow'.

Robert P. McCormack, aged 23, a Stoker, invalided for Epilepsy, July 18, 1911.

George Stripe, aged 41, an A. B., invalided for Pulmonary Tuberculosis, April 7.

John Pook, aged 45, an A. B., invalided for Chronic Bronchitis, November 10.

Invalided from the Military Hospital at Esquimalt.

John Jennings, aged 42, a Stoker Petty Officer, invalided for Chronic Bronchitis on December 14.

4 cases of death are recorded, 3 from the Eastern Depot and 1 from the Western Depot.

One in the person of J. Wm. Hayward, aged 39 years, Leading Stoker, took place suddenly on June 17 from failure of a Fatty Heart.

Thomas Palmer, aged 44, Stoker, died October 18, from Acute Dilation of the Heart following a bout of alcoholic excess.

John Wm. Shepherd, aged 42, Ship's Corporal died on December 14 at his private residence ashore where he had been ill for some time. He was treated by his own shore doctor who reported death due to Tuberculous Meningitis.

Albert E. Mundy, Leading Seaman, aged 36, died at the Military Hospital, Work Point Barracks, Esquimalt, November 6, from Acute Lobar pneumonia.

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The Hospitals to which cases are sent when it is necessary in Halifax are:—

1. The Military Hospital—for general surgical and medical cases. Whenever there is not accommodation here (as is sometimes the case for Officers) then:—
2. The Victoria General Hospital of Halifax is employed.
3. The Infectious Hospital of Halifax takes our infectious cases.
4. The Nova Scotia Hospital (for mental disease) at Dartmouth has been used for two mental cases.

The Dental Treatment of Recruits.

This question of proper care of the teeth and the sufficient number of molars in each recruit is one of great importance to the Service.

The arrangement made with the Dental College of Halifax to treat the cases sent up from the *Niobe* at reasonable cost has proved very satisfactory, except in so far as the authorities of this College are able to cope with only three patients at a time and the visits can only be arranged for three days in the week. On this account we have not been able to send all the cases who need treatment but those who have gone to the College have been the more urgent and in this way some thirty recruits have been given the opportunity of commencing their service career with a clean mouth and instructions as to how to maintain hygienic conditions during life.

THE ROYAL NAVAL COLLEGE OF CANADA.

The health of the Royal Naval College has been very satisfactory on the whole.

The very first term opened with a bad start, however, from the fact that a small outbreak of measles settled in soon after the Cadets joined in January, in fact four days after the opening of the College, Cadet J. Laurie developed the measles rash on January 25.

The other cases were:—

- Cadet Grant, January 28.
- Cadet Hibbard, February 5.
- Cadet Worth, February 5.
- Cadet Yates, February 5.

These cases were treated in the Military Hospital and ran normal courses, except in the case of Cadet H. Raymond B. Yates who contracted Malignant Endocarditis and became very seriously ill in the Hospital. His septic condition gained ground and the College lost the most promising of all the Cadets by his very sad death on Good Friday.

During the rest of the year slight illnesses such as Gastric upsets and minor injuries formed the majority of the cases on the Sick List.

Of the average daily numerical strength of the College and Dockyard, which totalled 63, 20 are Cadets.

Of this total of 63 the sick returns show from April 1 to December 31, 1912, a total number of 38 cases under treatment on the Sick List with 253 days sickness.

The average number of days each case was under treatment is 6.65. The percentage of sick for the Complement force is 60.31.

K. DIGBY BELL,
Acting Staff Surgeon, H.M.C.S. 'Niobe'.

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REPORT RESPECTING FISHERIES PROTECTION SERVICE OF CANADA.

OTTAWA, April 15, 1912.

The Deputy Minister,
Department of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to report with reference to the Fisheries Protection Service last season as to the number of vessels and men engaged and as to where each vessel was employed, with the names of the Commanding Officers and a brief description of each vessel.

I also append extracts from the annual reports of the various Commanding Officers giving details of the work carried out during the season 1911-12.

Eight vessels comprised the Fishery Protection Service for last Season under the direct supervision of the Department of the Naval Service.

Names of vessels and their Commanding Officers:—

Canada.—Lieutenant C. J. Stuart, R.N.R.

Curlew.—W. J. Milne.

Constance.—Thomas J. Kyffin.

Petrel.—Clement Barkhouse.

Vigilant.—P. C. Robinson.

(a) *Kestrel*.—Holmes Newcombe.

Restless.—Charles Moore.

Falcon.—Alfred Copp.

(a) Afterwards relieved by the SS. *William Joliffe*.

‘CANADA.’

Is a twin screw small third class ship; length 200', beam 25', draught 10' 6", gross tonnage 580 tons and speed 17 knots. She is armed with four 1½ lb. quick firing Mark III (1904) guns, two forward and two aft. She is electrically lighted throughout and fitted with a powerful searchlight and carries a crew of 58 officers and men all told. She was built by Vickers, Sons & Maxim, Limited, England, in 1904, and is under the command of Lieutenant Charles J. Stuart, R.N.R.

After a thorough overhaul during the winter at Halifax, the *Canada* commissioned on April 10 and was employed cruising during the season as requisite, on the East Coast, principally on the coast of Nova Scotia. Before leaving Halifax, Rear Admiral C. E. Kingsmill, Director of the Naval Service, inspected the vessel.

On May 8 after having had compasses adjusted *Canada* proceeded to sea, cruising to the westward and after visiting Mahone Bay and Chester returned to Halifax on May 11. On May 25 inclining tests for stability were carried out at Halifax under the supervision of Mr. Duguid of the Department of Marine and Fisheries. These tests having been completed, *Canada* proceeded to sea on May 30 and met the mackerel fleet off the port. Followed the fishing fleet as necessary until they dispersed off the North Shore of Cape Breton, calling at the following ports:—Port Dufferin, Isaac's Harbour, Whitehead, Port Hawkesbury, Canso and Sydney, C.B., arriving at the latter place on June 11. Owing to the prevalence of a thick fog *Canada* remained at Sydney until June 15, proceeding from then to Glace Bay and Chedabucto Bay, arriving at the latter place on June 17.

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On June 18 *Canada* visited Ponquet Island to obtain information concerning the steam trawlers operating in that vicinity, who were reported to have been disregarding the fisheries laws, and on June 19 returned to Halifax.

On June 26 left Halifax for Prince Edward Island, leaving Charlottetown on July 3 for Halifax again.

On July 8 *Canada* left Halifax for Quebec, calling en route at Charlottetown and Gaspé, and on July 12 anchored at Father Point in a thick fog.

Quebec having been reached on July 13, Rear Admiral C. E. Kingsmill, Director of the Naval Service came on board on July 14, and inspected ship on the way to Montreal. Owing to thick fog in the river the Admiral landed at Three Rivers and the ship returned to Quebec, leaving there on July 31 and cruising towards Prince Edward Island, calling at Gaspé, Pictou, George and North Sydney where the ship was coaled. Left North Sydney on July 29 cruising towards Gut of Canso. Owing to a gale of wind being met with off Cape North, ship returned to Aspy Bay for shelter, leaving there on July 30 and arriving at Port Hawkesbury next day and Georgetown on August 1.

On August 2 left Georgetown for Halifax, arriving on August 6, leaving there same day for Liverpool, with Captain Johnston, who was to be transferred to *Petrel* for passage to Clark's Harbour. Having transferred Captain Johnston ship returned to Halifax.

On August 8 in a dense fog proceeded to mouth of the Harbour to meet H.M.S. *Cornwall* and render any assistance in her work of towing H.M.C.S. *Niobe* into harbour, after having met with an accident off Cape Sable.

On August 11 left Halifax cruising towards the west, visiting Mahone Bay; then towards the east calling at Port Dufferin where several lobster traps were destroyed, Cape George, and arriving at Guysboro on August 18 to assist in the local regatta. Left for Georgetown on August 18 and thence arrived Halifax August 26.

On arrival at Halifax sent boats away to search Purcell Cove and North West Arm, destroying one submerged car containing 76 lobsters and many smaller lobster traps.

On September 26 left Halifax for Quebec, calling at Liscombe and Whitehead where ship was delayed for two days by bad weather, and Charlottetown where the Chief Engineer was sent to Halifax on sick leave. Left Charlottetown on October 1; rounded Cape Gaspe at 6 p.m. on October 2. At 10.30 p.m., owing to a change of wind and weather, which turned to snow, ship returned to Gaspé and remained there until October 4 when they left and arrived at Quebec, anchoring at Father Point and Murray Bay at 4 a.m., October 6.

On October 7 proceeded to Montreal, remaining there until October 11 when Admiral Kingsmill and Commander Roper, Chief of Staff arrived on board and ship left at 8 a.m. for Quebec, arriving there the same day.

On October 12, after the departure of Earl Grey, late Governor-General, Admiral Kingsmill and Staff and Colonel Pelletier, Officer Commanding Military District No. 7, embarked and ship proceeded down river on Departmental business, anchoring in Maheux Roads and returning to Quebec the same evening.

On October 14, after the ceremonies receiving the new Governor General, His Royal Highness the Duke of Connaught, *Canada* left Quebec for Nova Scotia, calling at Gaspé, Pictou, Port Hawkesbury, and Canso, arriving at Halifax 6 p.m. October 30.

On November 4 left Halifax cruising west, visiting Lunenburg, Mahone Bay, Chester and Aspotogan, but found very little illegal lobster fishing.

On November 9 proceeded to Port Mouton to investigate reports of lobster factories being in operation, but finding C.G.S. *Petrel* there, returned to Halifax on November 11, on which date Admiral Kingsmill and Staff and Rear Admiral Bradford Commanding Fourth Cruiser Squadron and Staff came on board, the ship proceeding to Bedford Basin and North West Arm.

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After returning to the Dockyard ship went into winter quarters and the ship's company were transferred to Barracks on December 21.

In March, 1912, certain alterations designed to increase the seaworthiness of the ship so as to render her more useful for Fisheries Protection purposes and also to allow of certain alterations and rearrangements of gun fittings, with the object of rendering the vessel more suitable for training purposes, were begun, and these alterations, which are being carried out by the Halifax Graving Dock Company are expected to be completed about June 20, 1912.

During the season 1911-12 C.G.S. *Canada* travelled 8,070 miles.

‘PETREL.’

Is a steel screw ship; length 116', beam 22', draught 10' 3", gross tonnage 192 tons, speed 10 knots. Her complement is 23 Officers and men all told and she is commanded by Captain Clement Barkhouse.

The ship was commissioned on April 1 and after finishing winter repairs, proceeded to Halifax on April 17 for adjustment of compasses.

On April 20 with Captain Milne of the C.G.S. *Curlew* as pilot, left Halifax for the Bay of Fundy station, calling at Liverpool, Shelburne, Barrington Passage, Brier Island and Digby, and arriving at Welchpool on April 27, communicated on arrival with Fishery Inspector Calder. Proceeded cruising on station, arriving at St. John May 6. On May 9 Captain Milne returned to *Curlew* and ship continued cruising on station, searching round Isle Haute and Quaco Ledges for fishermen dynamiting for pollock.

After calling at St. John, proceeded to Grand Manan and continued cruising around Grand Manan, Brier Island and Digby until May 19 when the ship was relieved by *Constance* at North Head, Grand Manan.

Petrel then proceeded to her cruising station on the south coast of Nova Scotia to watch the U. S. seining fleet. After arriving at Shelburne on May 22 the first of the seining fleet was boarded. The fishing fleet continued to arrive quickly and by May 30 the fleet numbered 32. The ship kept in close touch with the fishing fleet until they passed Canso and then crossed to the West and watched for stragglers. The fish were wild and scattered along the whole coast and very few catches were made, the mackerel fishing being a failure.

On June 10 the last of the seining fleet left and ship then continued cruising on station between Cape Sable and Straits of Canso. On June 12 proceeded to Seal Island and Wood's Harbour to look after the U.S. fishing smacks off these places.

On July 14 found the U.S. lobster smacks *Mary F. Smith*, *McNichol*, *Nellie M. Davis* and *Price of the Port* fishing with 150 to 200 traps each.

During this cruise ship found and destroyed 70 lobster traps which had been set inside the three mile limit.

On July 18 proceeded to Bridgewater to assist the Fishery Officer there and then continued cruising on station.

On August 1 arrived at Halifax, and on August 3 proceeded to stand by to render assistance to H.M.C.S. *Niobe* which had grounded off Cape Sable.

Continued cruising on station until August 6 when orders were received to proceed to Liverpool to embark Captain Johnston from *Canada*.

Ship then proceeded to H.M.S. *Cornwall*, arriving alongside H.M.C.S. *Niobe* at 6 a.m. on August 7 and in the evening of the same day, with the assistance of C.G.S. *Lady Laurier*, towed *Niobe* from Clark's Harbour out to H.M.S. *Cornwall* standing by to render assistance if necessary.

Ship then returned to Barrington Passage to search for uncharted rock on which H.M.S. *Cornwall* had grounded. The rock having been discovered, on August 12 proceeded to Shelburne.

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On August 14 with Lieutenant McLeod, Navigating Officer of H.M.S. *Cornwall* proceeded to the rock to verify position, returning to Shelburne August 19 when Lieutenant McLeod rejoined H.M.S. *Cornwall*.

Continued cruising on station until August 24 and after assisting the Fishery Officer at Bridgewater to settle a dispute, proceeded to Halifax, arriving there on August 30, with Captain Barkhouse sick on board.

The Captain was then sent to hospital for treatment and Captain Milne of C.G.S. *Curlew* took over command of the *Petrel*, after which ship continued cruising on station, returning to Halifax on September 15.

On September 18 Captain Barkhouse resumed command and Captain Milne returned to C.G.S. *Curlew*. Ship was then laid up for repairs to machinery which were complete on October 10.

On October 11, after settling disputes at North West, South West and Mill Coves, St. Margaret's Bay, continued cruising on station, arriving at Shelburne on October 17 and proceeded from thence to North West Cove, to investigate complaint.

On October 18 embarked Fishery Inspector Robertson and proceeded to Chester, embarking Fishery Overseer Webber at that place.

On October 21 proceeded to North West, South West and Mill Coves, St. Margaret's Bay, cautioning fishermen to take up their nets and collecting the license fees. Arrived Chester October 21 when Messrs. Webber and Robertson left ship.

Continued cruising on station until November 10 when ship arrived at Halifax and was inspected by Rear Admiral C. E. Kingsmill, Director of the Naval Service and Staff, after which ship proceeded to cruise on station again.

On December 14 proceeded to Liverpool to lay up for winter, arriving on 15.

Ship was put into winter quarters and crew paid off on December 20.

During the season very little illegal fishing was met with. The lobster catch during the open season was fairly successful, being above the average on the western coast. The eastern part of the coast fishing was only fair as the fishermen lost a great amount of gear owing to storms.

The cod fishing on the south shore was very successful, beating all previous years. Inshore cod fishing was successful at first but heavy gales set in early and put a stop to this fishing. The fall mackerel catch on the coast was a complete failure. The sword fishing was fairly successful, about forty boats being engaged during August and September.

During the season the ship steamed 5,700 miles and 99 U.S. fishing vessels were boarded.

' CURLEW.'

Is a twin screw iron steamer; length 116'; beam 19'8"; draught 11'3"; gross tonnage 158 tons; and speed 10 knots. Her complement is 20 Officers and men all told and she is commanded by Captain W. J. Milne.

On April 1, 1911, the ship was undergoing repair at Halifax Dockyard when a new boiler was installed, a new main deck laid and other much needed repairs performed.

On September 16, ship was commissioned and left Halifax, cruising towards the Bay of Fundy station.

On September 28, arrived at St. John relieving C.G.S. *Constance* which had been protecting the fish of that station since the beginning of the season. Afterwards the ship continued cruising on her station to prevent the United States sardine boats from fishing, and on October 26 proceeded to Yarmouth County and Seal Islands to watch the United States vessels engaged in lobster fishing.

On October 29 owing to the weather becoming very stormy, the last United States ship left for home and on November 4 *Curlew* returned to Bay of Fundy and cruised

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along the New Brunswick and Nova Scotia shores, keeping a careful lookout for illegal lobster fishing and destroying the traps set, &c.

On November 28 proceeded to Seal Islands through Schooner Passage, thence visiting Yarmouth and the Tusket Islands, and returning to St. John on December 3 where ship was coaled. Ship then proceeded to Yarmouth and Seal Islands and cruised along the southeastern shore of Nova Scotia towards Halifax, destroying several lobster traps illegally set along the route.

On December 20 crew was paid off and ship placed in winter quarters.

During the season ship steamed 2,000 miles, seized one boat for fishing during the 'Sunday Close Season' and one for driving herring, as well as destroying a number of lobster traps illegally set and boarding a large number of United States boats and schooners.

'CONSTANCE.'

Is a twin screw iron steamer, length 116', beam 19' 8", draught 11' 2", gross tonnage 185 tons. Her complement is 23 Officers and men all told and she is commanded by Captain Thomas Kyffin.

During the winter the ship was laid up in H.M.C. Dockyard, Halifax, and commissioned for the season on April 1, 1911, but did not leave until May 5 when she proceeded to the waters around Antigonish County and investigated several complaints of illegal fishing in that vicinity, but was unable to find any, so returned to Halifax on the 14.

On May 15 coaled ship and swung for adjustment of compasses and on the 17 proceeded towards Bay of Fundy to relieve *Petrel*, arriving at Flags Cove, Grand Manan on the 19.

On May 20 ship arrived at St. John, N.B., where she was grounded and her bottom and hull scraped and painted.

Continued cruising on May 29, calling at St. Mary's Bay, Westport, East Sandy Cove, Digby, and arrived at St. John on June 5. Leaving St. John next day the ports of Welch Pool, Lepreau, St. John and Advocate Harbour were visited and ship arrived at Digby on June 14.

Ship left Digby for St. John on 17 and then continued cruising to the westward from whence she proceeded to Whitehead, Grand Manan and Woodbridge Cove to consult with the fishery officers at these places, returning to St. John again on July 8.

Hearing reports of dynamiting being carried on ship returned to Grand Manan on July 15 but found no dynamiting.

Owing to foggy weather ship did not leave Grand Manan until July 20 when she proceeded to St. John calling at Beaver Harbour en route. On July 26 returned to Grand Manan Island; leaving there on 27, called at Briar Island, Muir Ledges, Campobello, Welch Pool, and arrived at St. John on 28.

On August 3 returned to Grand Manan Island, keeping a lookout for dynamiters, and then continued cruising, calling at Yarmouth and St. John and anchoring at Digby on August 11.

Continued cruising on station until August 15 when ship proceeded to Welch Pool to consult Fishery Inspector Calder, remaining there for the Regatta on the 16 when the Honourable the Minister of Public Works went on board the ship to view the water sports.

On August 17 continued cruising, calling at St. John, Beaver Harbour, Bliss Harbour, Briar Island, Grand Manan Island, Old Proprietor Ledge, Wolfe Island and Lepreau Harbour, returning to St. John on August 25.

Left St. John on August 30 and continued cruising around Grand Manan Island, calling at Welch Pool, Bliss Harbour, Black's Harbour and arriving at St. John on September 4.

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On September 8 continued cruising, calling at Musquash, Lepreau Harbour, Welch Pool, returning to St. John on September 10.

Continued cruising on 13 towards Welch Pool, where on anchoring the starboard anchor and cable carried away, and, although the following day was spent in dragging was not recovered.

Continued cruising on 15, anchoring at Black's Harbour and returned to St. John on 17.

Left St. John for Welch Pool on the 18 and there recovered anchor which had been lost; proceeded thence to Halifax, after turning over the Bay of Fundy Station to Captain Milne of C.G.S. *Curlew*.

Arrived at Halifax on October 8 when certain small repairs were undertaken and proceeded on October 18 to a station on Prince Edward Island, arriving on 23.

Continued cruising on station until orders were received to be at Halifax on November 10.

On November 16 Rear Admiral Kingsmill, Director of the Naval Service, came on board to inspect ship and on 18 ship continued cruising, calling at Lunenburg, Shelburne and Sand Point, where eleven fishing vessels were boarded; thence cruised to Lockport, Port Mouton and Liverpool, arriving at Halifax again on November 28.

On December 20 ship's company was paid off and ship went into winter quarters.

During the season the lobster laws in the Bay of Fundy were well observed, the greater part of the trouble having arisen from the dynamiters.

The Fall catch of mackerel on the Prince Edward Island Station was a complete failure, the line fish and lobster catch being about the average.

The poor fishing was due to a large extent, to the bad and foggy weather which prevailed.

'VIGILANT.'

Is a steel twin screw ship, length 175', beam 22', draught 10', and gross tonnage 396 tons. She is electrically lighted throughout and fitted with a powerful searchlight. Her complement is 30 officers and men all told and she is commanded by Captain P. C. Robinson.

The ship having been given a thorough overhaul during the winter 1910-11 at Polson's Iron Works, Toronto, was commissioned on April 20 and proceeded to sea on a trial trip with the President and Manager of the Polson Company on board. The trial was satisfactory, with the exception of a defective joint on safety valve of forward boiler. The defect having been made good in dock, *Vigilant* left Toronto and passing through the Welland Canal arrived at Port Colborne.

Proceeded on April 28 and after calling at Port Dover to land stores, on May 2 proceeded to cruise on station towards the westward, calling at Port Stanley Kingsville.

Very little poaching was found while ship was in commission, and cruising was carried on as requisite until July 1 when *Vigilant* arrived at Port Dover to assist in a celebration.

On September 18, Rear Admiral C. E. Kingsmill, Director of the Naval Service and Staff inspected the ship.

During November very little cruising was done as owing to the bad state of the weather, very few fishermen were operating.

After December on account of the low price of fish very little fishing was done and the majority of the U.S. tugs were laid up.

During the season *Vigilant* called at various life saving stations and reported on conditions there.

Amongst other services a wachman's clock system was installed at the Point Pelee Life Saving Station and at East End Long Point Light Station a boat being built for the station was inspected and reported on.

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The total number of nets taken during the season was 304, of which 110 were sold by *Vigilant*, the Inspector of Fisheries at Toronto disposing of the remainder.

Vigilant steamed 5,955 miles during the year.

‘KESTREL.’

Is a wooden screw steamer, length 126', beam 24', draught 12', gross tonnage 311 tons, and speed 10 knots. She was built in Vancouver, B.C., in 1903. Her complement is 23 Officers and men all told and she is commanded by Captain Holmes Newcomb.

The *Kestrel* was employed in keeping U.S. fishing vessels outside the forbidden limits on the west coast and keeping the harbours clear, and was assisted by the small cruisers *Falcon* and *Restless*.

On April 1 ship was at Union, but orders were received to proceed to Vancouver and thence to Esquimalt. On April 21 ship proceeded to Vancouver to allow Captain to give expert evidence in the trial concerning the capture of the U.S. Steamship *Edrie* by H.M.C.S. *Rainbow* in February 1911.

Leaving Vancouver on May 1, *Kestrel* proceeded to Union to coal and then cruise as necessary on station, arriving at Prince Rupert on May 13.

The SS. *Germania* having been chartered as a fishery protection vessel, First Officer Ledwell was appointed in command and *Kestrel* proceeded to Hardy Bay on the 17 to transfer Captain Ledwell. Cruising was then carried on on the station until May 31 when ship returned to Union to coal, returning again to her station on completion of coaling ship.

Orders having been received to proceed to Nanaimo *Kestrel* arrived there on June 18, and then proceeded to Esquimalt, arriving on the 19.

On July 10 ship was paid off and stripped ready to be sold out of the Service, and Captain Newcomb proceeded to take command of the *William Jolliffe*.

From April 1 to July 10 *Kestrel* had cruised 3,216 miles.

‘WILLIAM JOLLIFFE.’

Was chartered as a Fishery Protection Vessel from the British Columbia Salvage Company and left Esquimalt on July 10 with Mr. Taylor, Inspector of Fisheries, on board and inspected the Juan de Fuca Straits inspecting the salmon traps, returning to Victoria the same evening to land Mr. Taylor.

Continued cruising as necessary, following the fishermen and driving them out of the harbours, arriving at North Island on July 24. From thence cruised southward along the west coast of Queen Charlotte Islands, calling at all the bays and inlets en route and after gaining much useful information with reference to new fishing banks, &c., arrived at Esquimalt August 1.

On the return trip, arrived at Departure Bay on August 12, proceeding the same day over the west coast where a U.S. brig was found anchored on Swiftsure Bank, exceedingly well fitted out with appliances for taking and preserving salmon and also possessing 14 to 16 gasoline launches for running into the mouths of the various streams along the coast in the absence of the Fishery Protection Cruiser. This brig was warned against fishing inside the three mile limit.

Continued cruising in these waters until August 26 when a gasoline launch, which proved to be the *Seara* of Seattle, was captured and towed to English Bay, where she was turned over to Inspector Cunningham, the *Restless* taking her in tow to New Westminster. The *William Jolliffe* then proceeded cruising on her own station arriving at Esquimalt on September 1.

Leaving Esquimalt on September 4 ship continued cruising and after destroying a net anchored across Saratia River continued cruising to the northwards, and having driven the U.S. fishermen *Washington* out of Goose Island Harbour on September 12 arrived at Esquimalt on September 30.

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During the month of October ship continued cruising northwards as necessary, assisting the SS. *Campac* to remove a boom of logs from the main channel on the 10.

During the month of November ship cruised on the west coast as necessary and on the 12 six U.S. fishing vessels were turned out of Sidney Inlet and on 19 ship proceeded to Vancouver to allow the Captain to attend the trial of the seized sloop *Seara*, which vessel was condemned by the Court to be sold.

The *William Jolliffe* then proceeded to Esquimalt on October 20 and was there fitted with wireless telegraphy. Having embarked Mr. C. P. Edwards, General Superintendent Government Wireless Service and Mr. Stephenson, Chief Electrician, ship left to visit all wireless stations and on November 29, having received distress call from the stranded steamer *Tees*, proceeded to her assistance, picked up one of her boats on December 2 and arrived at the steamer the same day.

Other assistance having arrived ship continued her regular work and having called at Triangle Island, Ikeda Head and other stations reached Esquimalt on December 10 and disembarked Mr. Edwards.

The ship then continued cruising until 23 on which date Esquimalt was reached.

In the month of January the ship cruised in the northern waters amongst the fishermen as required, arriving at Union on February 2 for coal.

Leaving Union ship cruised on the west coast until the 13 when she proceeded to Queen Charlotte Islands in search of a tug and schooner supposed to have been wrecked on this coast, of which however no trace was found.

The *William Jolliffe* then continued cruising on her station as requisite.

During the season several vessels were chartered to assist in fishery protection work, among them being the *Sebastian*, *Grant* and *Germania*. Considerable poaching was found during the year, not only for halibut, but also for salmon and herring. The foreign fishing fleet was very largely increased, many of the older craft being replaced by faster and more up-to-date boats.

During the season *William Jolliffe* was in commission she steamed 15,348 miles.

Considerable information as to the age and habits of halibut has been gained during the last season.

Although there has been very little fishing carried on in Hecate Straits the catch has been above the average, amounting to 9,030,680 lbs. for Canadian boats, the increase of catch being accounted for by the extra number of boats fishing and the new banks which have been located in Dixon Entrance and the west coast of Queen Charlotte Islands.

‘RESTLESS.’

Captain Charles Moore, was working at the North end of Vancouver Island until April 7 when he proceeded to Union Bay to coal ship and thence to New Westminster, B.C., to report to Mr. Cunningham, Chief Inspector of Fisheries, arriving on April 11.

From this date until May 26 ship was being overhauled and repaired, and on 27 commenced patrol duty on the Fraser River and Gulf of Georgia.

On June 14 conveyed Mr. Cunningham, Professor Halkett and Mr. C. B. Sword, Inspector of Fisheries, to visit the American Salmon traps at Port Roberts and Boundary Bay, proceeding then to Blaine, U.S., where the party disembarked.

Continued cruising until July 7 when Mr. Cunningham again came on board and proceeded on tour of inspection of all the salmon stations in the Northern District under the charge of Mr. J. T. Williams, Inspector of Fisheries.

During this trip the following canneries were inspected:—Quathrasca Cove, Alert Bay, Smith's Inlet, Rivers Inlet (at which place Inspector Williams came on board), Namu, Bella Coola, Kimsquit, Buteglen, Lowe Inlet, Skeena River, Wales Island and Naas River.

Ship having returned to Prince Rupert on June 18, Inspector Williams disembarked there and ship proceeded to New Westminster, arriving on the 24.

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On July 26 continued carrying on patrol duties on the Fraser River and Gulf of Georgia until November 16, during which time various trips were made to Blaine, Anacortes, Cowichan, Nanaimo, Departure Bay, and Jarvis Inlet.

During this period five boats were arrested by the *Restless* for violation of the fishery rules and regulations and fined by the Chief Inspector in each case.

On November 6 vessel proceeded to Esquimalt, arriving on the 8, and was then equipped for patrol service during the winter, after which on November 17 took C.G.S. *Falcon* in tow to Victoria, proceeding thence to Nanaimo to meet Captain Newcomb for further orders.

On receipt of these orders proceeded North as far as Hope Island for patrol duty on that station.

Since arriving on this station no foreign fishing vessels were seen or heard of, which is possibly accounted for by the bad weather conditions which prevailed.

During the year *Restless* steamed 6,580 miles and was at sea 750 hours.

‘FALCON.’

Captain Alfred Copp, was employed under the orders of Captain Newcomb of the *Kestrel* and *William Jolliffe*.

Left Esquimalt November 25 for Prince Rupert, calling at Vancouver en route and arriving at Prince Rupert on December 5. Continued cruising between the North end of Banks Island and to North of Dundas Island watching the harbours there and keeping the United States fishermen on the move.

The following United States ships were ordered to sea, having been found within the three mile limit:—

On December 14 on White Rock the American Gasoline Schooner *Director*.

On December 18 at Butter Cove the Stephens Islands, the American Fishery Steamers *Manhattan* and *San Juan*.

On December 26 at White Rock, Banks Island, the Fishery Steamer *Grant*. The latter ship was allowed to shelter for the night owing to heavy weather, but later dragging her anchors went on the rocks and became a total wreck, her crew of 40 officers and men being taken on board the *Falcon* and landed at Prince Rupert.

On January 10 certain repairs were effected to the *Falcon* at Digby Island, and ship proceeded to sea again on the 21.

On February 4 while at Stanley Harbour, Dundas Island, the United States Steamship *Carona* of Seattle came in with machinery broken down; having effected repairs she was ordered to sea on the 6.

On February 8, whilst cruising near Dundas met with the Canadian Gas Schooner *Princess Victoria* with sails blown to pieces and machinery broken down. Towed this ship to safe anchorage but as repairs could not be effected on board, continued towing her on February 11 to Prince Rupert, arriving that day at 4 p.m.

On February 16 helped the Gas Schooner *North Laund* of Seattle to make good her repairs and ordered her to sea on the 18.

Until the middle of February the weather was very stormy and few United States vessels were met with. The weather, however, improved after this and fishing became better.

On February 25 arrived at Prince Rupert to coal ship and left on 27 to cruise in Hecate Straits.

Total number of miles steamed by Ship from November 29 to March 31 was 2,112.

I have the honour to be, sir,

Your obedient servant,

C. E. KINGSMILL,
Rear Admiral, Director of the Naval Service.

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REPORT ON THE SURVEY OF TIDES AND CURRENTS.

OTTAWA, April 1, 1912.

The Deputy Minister,
Department of the Naval Service,
Ottawa.

SIR,—I have the honour to submit the following report of the work done in the Survey of Tides and Currents, during the twelve months ending March 31, 1912. In general terms, the work comprises the maintenance of the principal tide stations in Eastern Canada and on the Pacific Coast; further investigation of the tides and currents during the summer months; the reduction of the observations to make the results of practical use; and the publication of Tide Tables and other information. The surveying steamer C.G.S. *Gulnare* was again utilized for the investigation of the currents during last season. The tidal stations on both coasts were visited for inspection and repairs, and some improvements were introduced.

TIDAL OBSERVATIONS.

The principal tidal stations have been maintained in continuous operation throughout the year with little interruption, except at Port Simpson and Prince Rupert in British Columbia. There are six of these stations in Eastern Canada, and five on the Pacific Coast. These are maintained summer and winter, as it is essential to obtain a continuous record throughout the year as a basis for the calculation of tides tables. Special arrangements have been made by which the time can be obtained correctly, as in winter some of the stations are cut off from communication, except by telegraph.

To utilize the tidal record as a basis for calculation of tide tables, it is necessary to make good any breaks or interruptions that occur, by a special method of interpolation. It is also necessary to reduce the observations to a uniform datum level, which is maintained from year to year by means of instrumental levels and comparisons, which are taken throughout the progress of the observations. The height of the tide is thus referred to a uniform low-water datum, which accords with the low water of the charts. By this method, the height of the tide in the tide tables shows the depth of water available in addition to the chart soundings.

During the year, the following tidal record has been reduced and submitted to harmonic analysis:—For Eastern Canada, 2 years of record from Quebec, 2 years from Father Point, 3 years from St. Paul Island, and 2 years from St. John, N.B. For the Pacific Coast, one year of record from each of the following stations: Clayoquot, which is the reference station for the west coast of Vancouver Island, Victoria, Vancouver and Prince Rupert, B.C.

This reduction of 13 complete years of tidal record represents a large amount of work, and will result in a very substantial improvement in the accuracy of the tide tables. Those for Eastern Canada are now more accurate than any for the Atlantic Coast of the United States, with the exception of Charlottetown which is a comparatively new station; and on the Pacific Coast three of our reference stations are now equal or superior in accuracy to any port on the Pacific Ocean, in America, Asia or Australia; and the fourth reference station at Clayoquot is already equal in accuracy to any on the Pacific Coast of the United States with the exception of San Francisco.

FURTHER OBSERVATIONS OF THE CURRENTS.

During last season an investigation of the currents in the entrance to the St. Lawrence was carried out; and for this the C.G.S. *Gulnare* was utilized. This is an important region, as it is traversed by steamships on the Belle Isle route as well as by those passing south of Newfoundland; and also by the lines of coasting steamers from Sydney to Montreal.

Observations of the set of the current were taken, day and night, at the Lightship stationed off Heath Point, Anticosti. On the surveying steamer, the observations were made continuously day and night with the aid of current meters and electrical appliances. The information obtained was thus accurate and definite.

The currents in the passage between Anticosti Island and the Gaspé Coast are very different in their character on the two sides. Off the coast of Anticosti, they veer continually in direction, while on the Gaspé side the current sets constantly and strongly outwards. As both classes of currents are dominated by tidal influence, it was thought advisable to establish a tide gauge for reference at South-west Point, Anticosti; but unfortunately this was carried away early in the season. It was found however, that Father Point is quite satisfactory as a reference station, and by its use the currents are brought into direct relation with the Father Point tide tables, which are published annually. The influence of the wind upon the currents was also carefully observed; and complete information as to the wind itself was obtained from an anemometer on board, which was read every four hours day and night continuously, while a barograph gave a continuous record of the fluctuations of the barometer.

With such appliances it was found possible to obtain very complete information. The observations could be continued without interruption during fog or rain; and good record of the current could be obtained so long as the waves did not exceed six or eight feet in height. The chief source of interruption was the entire want of shelter on such exposed coasts; and when heavy weather came on, it was often necessary to make a long run. The depths in which anchorages had to be made were also great; as on the Gaspé side they range from 135 to 215 fathoms; and as the bottom consists of soft clay sufficiently adhesive to ball around the anchor, it makes very poor holding ground.

These investigations were carried out under the personal supervision of the Superintendent, with the assistance of Mr. S. C. Hayden who had charge of the work during the latter part of the season. The night observations were taken by Mr. F. Nash and Mr. R. Hogg. Captain C. T. Knowlton also gave valuable co-operation in addition to his regular duties.

The results of these observations have been thoroughly worked up during the winter, and they will undoubtedly prove valuable to shipping, as a large proportion of the whole commerce of Canada passes through this region. A 'Notice to Mariners' was prepared to explain the leading features of the Gaspé current, and the best routes to follow to take advantage of it, or to avoid it, as the case may require. The following summary description is taken from this Notice.

CURRENTS IN THE ENTRANCE TO THE ST. LAWRENCE.

There is a constant downward current in the middle of the St. Lawrence estuary which continues along the south shore for the whole length of the Gaspé Coast. This constant outward tendency, as distinguished from the usual tidal behaviour of the Lower St. Lawrence, is first felt below Red Islet, near the mouth of the Saguenay. It is met by a cross current from Pointe des Monts, setting towards Cape Chat. Below this, the outward current is still more pronounced, and is known as the 'Gaspé Current.' It follows the curve of the Gaspé coast as far as Cape Gaspé, from which it sets across the Gulf of St. Lawrence towards the Magdalen Islands.

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The Gaspe Current.—Along the Gaspe Coast the current sets downward, from one or two miles off shore to about ten miles off. Although constant in the sense of being always in the one direction, it is subject to a strongly marked fluctuation in speed in strict accordance with the tide; being stronger during the ebb and weaker during the flood. Its greatest strength is at an offing of 4 or 5 miles, where it attains a speed of over 3 knots at the springs and about $1\frac{1}{2}$ knots at the neaps. At an offing of 8 miles it is much weaker, and at 12 miles any current there is, is no longer continuously downward.

Currents elsewhere.—In the middle of the passage between the Gaspe Coast and Anticosti, and on the Anticosti side, the currents show as their leading characteristic, a continuous veer around the compass in the right hand direction, in the tidal period. There is good evidence that the water there makes westward on the whole, to compensate for the outflow of the Gaspe current.

Wind disturbance.—The most careful attention throughout the season was given to this question; with appliances registering speed to $\frac{1}{30}$ th of a knot, and comparison of the surface current with the speed and direction beneath, to detect disturbance. Nothing was more striking than the apparent indifference of the currents to the wind as a general rule. The weakest currents would set directly into the wind, just as usual, as they veered around. It was not evident during the course of the investigations, that strong winds and gales had any effect on the flow of the Gaspe current, unless this can be detected when the observations are subjected to a searching analysis, with allowance for tidal fluctuation.

It is the usual winds, which are almost always up or down the coast, that seem to have so little influence on the current. But there is some evidence that with off-shore winds from the southwest, which are unusual in the summer season, the Gaspe current may be displaced in position, and lie farther out. Hence at a given offing, the current may appear to be checked by the wind, as it may have taken a different route, nearer the middle of the passage. Also, northerly winds may possibly make the current narrower and stronger, by pressing it against the coast.

The Caution on the charts, 'Currents governed principally by wind,' is therefore so erroneous as to be quite misleading. Also, the two lines of current on the chart of Anticosti Island, may be regarded as alternative routes; though the outer route, in the middle of the passage, is quite unusual and should be so indicated.

In-shore flood stream.—There are times when a flood stream is found to occupy a width of one or two miles between the Gaspe current and the shore. According to information obtained from the captains of the coal steamers, this may be described as follows: From Cape Rosier to Cape Magdalen, at one mile off, the flood stream has a speed of one knot at the most. From Cape Magdalen to Cape Chat the downward current appears to keep close in, as indicated on the local charts; and it is thus only weakened during the flood, without being reversed. Above Cape Chat the upward set on the flood may extend as far as two miles from shore; but it may not be found during the neap tides. This in-shore flood is thus more pronounced above Cape Chat; and it becomes a feature which extends a long way up the estuary.

Course inwards.—The coasting steamers engaged in the coal trade, when inward bound, are tempted to take a route close in shore, to avoid the Gaspe current and obtain help from the upward flood. Apart from the risk of keeping within a mile or two of the shore, this in-shore flood is in most places only strong enough to be of service about the time of spring tides and then only for the flood period. After the six hours of flood, in which some 60 miles along the coast are made, these steamers must sheer out to a greater offing; as for the next six hours the in-shore ebb stream adds to the strength of the main current.

The captains with longest experience therefore maintain that better time can be made by keeping out to an offing of 8 or 10 miles near the outer edge of the Gaspe

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current where it is usually weak enough to be inappreciable. Record time has been made at this offing; and one captain claims that at an offing of 12 miles he only lost a quarter of an hour from current as far in as Pointe des Monts.

The best inward route from Bird Rocks is to make the Gaspé coast at an offing of 14 miles at Cape Rosier, and to maintain an offing of ten miles from Fame Point to Cape Chat. Sailing vessels should tack when ten miles off. From there, the choice is open to make Manikouagan and follow the north shore, which may be advisable for better shelter in the autumn or at any other time when northerly winds are prevalent, keeping the weather clear.

The investigation on this season also show that Atlantic steamers, inward bound, will gain time by making a straight course from Bagot Point, Anticosti, to a point 10 miles off Cape Magdalen, and thence maintaining the same offing till within the mouth of the estuary opposite Pointe des Monts.

Outward course.—A distinct advantage will be gained by all vessels, by keeping in the strength of the Gaspé current, at an offing of 4 to 5 miles, from Cape Chat outward. Even steamers on the Belle Isle route may obtain an advantage by following the rounding of the coast at this offing as far as Fame Point at least, before turning off towards Anticosti. The distance that the coast should thus be followed will be greater if it is ebb tide at the time; as they may then obtain as much as 3 knots in their favour, which will more than compensate for the slight extra distance by the chart. All coasting steamers, and Atlantic steamers on the route south of Newfoundland, will gain by keeping this offing till they leave the Gaspé coast.

INFORMATION ON THE TIDES.

The observations obtained in the season of 1910, along the north shore of the Gulf of St. Lawrence from Seven Islands to Belle Isle strait were finally reduced to a form suitable for publication in the tide tables. This stretch of coast was divided into three parts; the western end as far as Mingan being referred to Father Point, and the eastern end being brought into relation with the principal station in Belle Isle Strait. In the middle section, it is necessary to distinguish high water and low water, and to refer them separately to St. Paul Island and Father Point, which are the two principal stations that command this region. The tidal differences resulting were put in tabular form in the tide tables, which makes the whole matter clear and easy to follow. The time of high and low water at all the harbours along the north shore of the Gulf, can thus be found readily.

On the Pacific Coast, the principal progress made was in the improvement of the data for the tidal portions of the two chief rivers, the Fraser and the Skeena. From the observations at Essington on the Skeena, the variations in the time of the tide were fully ascertained and reduced to practical shape. On the Lower Fraser, observations at Port Haney and Sumas extending over considerable periods were obtained from Mr. G. A. Keefer, Resident Engineer of Public Works. These were simultaneous with the continuous record obtained from New Westminster. The tidal variation on the river is complicated by the annual freshet; but its variations have now been determined and are explained in the tide tables. These will be of value to several ports on the Lower Fraser which are developing rapidly.

Further observations were obtained by the Hydrographic Survey in British Columbia, by means of tide gauges supplied by this survey. These were taken at two points on the Queen Charlotte Islands, at Pacofi and at Queen Charlotte City in Skidegate inlet; and also at Ocean Falls, at about the middle of the length of Gardner channel where a large industry has been started. Another tide gauge was placed by the Hydrographic Survey at Escoumains on the Lower St. Lawrence, for reference in the reduction of soundings. The tidal record obtained from these new places will be of value in extending the information which this survey can publish.

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The new information regarding Seymour Narrows and the series of narrows and rapids between the islands eastward to the mainland, referred to in the last report, has now been published in the tide tables. This enables the time of slack water to be known in a number of intermediate passes between Seymour Narrows and the Yuculta, which are used by coasting steamers and also in the lumber industry. The tables of slack water for Seymour Narrows have also been improved in accuracy by means of better data obtained from these observations.

GREAT LAKES.

The observations in the Great Lakes were continued in Georgian Bay during last season under the supervision of Professor Loudon. A small grant for expenses was made from the appropriation for this survey. The water level in Lake Ontario is also observed at Toronto by the Deputy Harbor Master; and the record is forwarded to the office of this survey.

ARCTIC OCEAN AND HUDSON BAY.

During Captain Bernier's latest expedition in the C.G.S. *Arctic*, further tidal observations were obtained by means of a large type of registering gauge supplied by this survey. The observations were taken by Mr. J. T. E. Lavoie. They will afford further information in this new region, and they have also the advantage of being taken with a modern type of recording instrument.

The information as yet available for Hudson Bay is very meagre. It has recently been ascertained however, that a large amount of valuable information for Hudson Strait was obtained during the Gordon Expeditions of 1884 to 1886. In Lieut. Gordon's report, it was stated that observers were placed at a number of stations along Hudson Strait during two successive winters; and detailed instructions of the tides, as well as the meteorological conditions. As no tidal information worth mentioning was ever published in Gordon's reports, inquiries were instituted regarding the matter. It was eventually ascertained that the whole series of original observations have remained in the custody of the meteorological office in Toronto; and these have now been secured for this survey. They are of much value now that the navigation of Hudson Strait and Bay are being seriously considered; and more especially when the range of the tide in the middle of Hudson Strait amounts to 30 feet.

The observations referred to were taken at Port Burwell near Cape Chidley, at Ashe Inlet, Stupart Bay, Nottingham Island and Cape Digges. These observations extend over several months including parts of the summer season, and at three localities they are continuous throughout the winter. They are also sufficiently simultaneous to enable the progress of the tide to be traced throughout the strait.

Some recent observations have been obtained by the Hydrographic Survey in 1910 and 1911 at Churchill and Nelson. These extend over a period of about two months in each instance. Copies of these records have been furnished to this survey.

INFORMATION SUPPLIED.

A number of tide tables are sent on request in addition to those addressed regularly from our mailing lists. Amongst the requests received for tide tables, it is interesting to note the number asked for by industrial establishments, quite apart from their use in navigation. Many inquiries are received which can be met by looking up the special information asked for, in reports already published. Amongst the requests received during the year, the following may be mentioned as illustrations of their miscellaneous character:—

The range of tide at St. John, N.B., sent to the British Admiralty, together with the extreme difference in the level of the tide there during nine successive years. Required to correct rise of tide at St. John.

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Tracings of tide curves at Moncton on the Peticodiac river, showing the arrival of the Bore. This record was sent to the British Admiralty on request. It was obtained by means of a recording gauge of special design, devised by the Superintendent, to obtain data for the time of the arrival of the Bore.

Advance information on the tides of the Lower Fraser communicated to the Resident Engineer of Public Works at New Westminster, B.C.

The temperature of the water in the Bay of Fundy at the surface and below to a depth of 30 fathoms as obtained in 1904 and 1907, sent on request to the Fisheries Inspector at Weymouth, N.S.

Advance information regarding the tides on the Lower Skeena supplied to the General Superintendent of the Hydro-Electric Co., Prince Rupert, B.C.

The range of the tide at Massett harbour and in Massett Lake in the Queen Charlotte Islands, prepared for a Civil Engineer in Vancouver.

Several requests were received for information as to the tides of the Bay of Fundy, their greatest height, the time of high water at future dates, &c.

As a basis for the geodetic levels undertaken by the Dominion Observatory, complete data for mean sea level have been brought up to date for Quebec, Father Point, Halifax and St. John, N.B. This is the result of extra work done by the Superintendent for a number of years, undertaken because of its value from an engineering standpoint.

CO-OPERATION WITH OTHER SURVEYS.

Arrangements have been made, as in previous years, for co-operation with other surveys in view of the work of the coming season, by supplying them with self-registering tidal instruments and the necessary outfit with them. By careful consideration of the conditions, and by supplying instruments with a suitable scale together with an outfit adapted to the locality, much labour and expense are saved to those surveys. In return, they hand over to this survey the tidal record obtained, after they have taken from it the data required for their own purposes. From such records additional information is obtained for publication in the Tide Tables.

In accordance with this plan, observations will be obtained at the following localities during the coming season:—

The Hydrographic survey in British Columbia will place two gauges in Hecate Strait to obtain tidal data for the reduction of soundings. These will probably be placed in Cumsheewa Inlet and at Kitkatlah on Porcher Island.

On the Upper Skeena, a tide gauge will be placed by the Hydro-Electric Power Co. of Prince Rupert, at the mouth of the Ktada River or the Hocsall, where their power works are being erected.

Three registering tide gauges have been supplied to Mr. J. K. Scammel of the Public Works department, St. John, N.B. These will be placed at suitable localities along the St. John river to obtain a simultaneous series of observations of its variations in level.

The Chief Engineer of the Temiskaming and Northern Ontario railway has been supplied with a tide gauge for use at Moose Factory on James Bay. This will afford tidal information for a new locality of growing importance.

For the Hydrographic survey on the Lower St. Lawrence, a tide gauge will be supplied if required; unless the principal tide station at Father Point will serve for the region to be surveyed this season. In the past two years the Hydrographic survey has obtained tidal information at Bic Harbour and at Escoumains on the North Shore of the St. Lawrence.

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PUBLICATIONS.

The tidal information for Canada is now published in two sets of Tide Tables, one for the Eastern Coast and the other for the Pacific. This division facilitates their distribution. The editions of these tables now amount to 4,000 for Eastern Canada and 5,000 for the Pacific Coast. A large proportion of these are addressed individually. All the steamship companies on both coasts are supplied with them, as well as a number of industries on the coast such as saw-mills, canneries, whaling establishments, &c. The tide tables are much appreciated also by fishermen, as in many cases the best catch is at the turn of the tide. In British Columbia large numbers of tide tables are supplied to the various booksellers who have the opportunity to distribute them.

In addition to the complete tables, two Abridged Editions are issued of pocket size. One of these is for Quebec and the St. Lawrence, 2,000 in quantity; and the other for St. John, N.B. and the Bay of Fundy, of which the issue now reaches 6,000. The circulation of these abridged editions is steadily increasing, and with the help of Harbour masters and Customs officers, they reach all classes of mariners down to the fishermen on the coasts.

The information in the tide tables for Eastern Canada has been much increased and largely rearranged. In next year's tables, the tide at Summerside, P.E.I., will be published on account of its growing importance on the line of communication with Prince Edward Island.

On the Pacific Coast, new information is added as the investigation of the survey are extended, some of which has been already indicated. The basis from which the tide tables are calculated is also steadily extending for the improvement of their accuracy.

Some of the more important tide tables and other tidal information are republished in the *Canadian Almanac*, and also in *Belcher's Almanac* for the Maritime Provinces. For Quebec an edition of the tide tables is published by T. J. Moore & Co. Also, in British Columbia some of the tide tables as well as slack water for First Narrows at Vancouver, are reprinted by private enterprise; and they are also published in the daily papers.

At the beginning of the year, several articles were written for the newspapers in British Columbia and the Maritime Provinces, drawing attention to new information in the tide tables, and explaining the tables of slack water for Seymour Narrows which is of interest to mariners on the Pacific Coast.

In addition to the information published in the tide tables, the data for St. Augustin bar in the St. Lawrence above Quebec are computed for a publication issued by the Ship Channel survey in which the tides at Cap à la Roche Quebec are also included. The Time of the tide during the tourist season on the Lower St. Lawrence is prepared for Little Metis and Tadousac, and posted in the hotels and the Post Office for the convenience of the summer visitors. Tourists also appreciate the time of the arrival of the Bore at Moncton at the head of the Bay of Fundy, which is included in the pocket edition of the St. John Tide Tables. These accessory tables are prepared by a little extra work in the office and without even the expense of printing, as a rule.

Advance copies of our principal tide tables are supplied to the British Admiralty for inclusion in their annual publication. The ones thus supplied are Quebec, Father Point, Halifax, and St. John, N.B., together with Victoria, Sand Heads, Vancouver and Port Simpson, B.C.

A complete revision has been made of the tidal information given in the 'Sailing Directions' for Quebec, and through the Traverse to Orignaux Point, based on the results obtained by this survey to date. This has been supplied to the Hydrographic survey for the Canadian edition of the 'Sailing Directions' in preparation.

STAFF.

This survey is carried on by the office and field staff, the officers and crew of the surveying vessel, and the outside tidal observers, who number eight on the Eastern Coasts of Canada and nine on the Pacific Coast. The permanent assistants in addition to the Superintendent are Mr. S. C. Hayden, Mr. H. W. Jones, B.Sc., and Mr. P. M. H. LeBlanc, C.E. This staff overtakes the outside work during the summer season; and in the winter, the reduction of the observations and calculations of tide tables as well as the ordinary office work.

Respectfully submitted,

W. BELL DAWSON,
Superintendent of Tidal Surveys.

DEPARTMENT OF THE NAVAL SERVICE—HYDROGRAPHIC SURVEY.

OTTAWA, July 25, 1912.

SIR,—I have the honour to submit the annual report upon the progress of the Hydrographic Survey for the fiscal year ending March 31, 1912.
The following Hydrographic Surveys were carried on during the season of 1911:—

Branch.	Steamer.	Nominal Horse Power.	Gross Tonnage.	Officers and Men.
Lake Ontario.....	Bayfield... ..	112	276 (86)	25
Lower St. Lawrence.....	Cartier.....	141	556 (224)	32
Pacific Coast.....	Lillooet.....	94	575 (311)	38
Hudson Bay.....	Minto.....	450	900 (372)	51
	Schooner Chrissie Thomey.....		136 (123)	14
	" Burleigh... ..		130	10
St. Lawrence River at Lachine Rapids.	Gasolene Launch.....			

The number of officers of all ranks employed was 41, of whom 23 were surveyors. The men employed on the surveying parties number 152.

LAKE ONTARIO BRANCH.

With the twin screw steamer *Bayfield*, was in charge of Mr. A. G. Bachand, who was assisted by Mr. E. Ghysens. The officers of the steamer were Sailing Master Wm. McQuade, and Engineers John Nisbet and Wm. Baker.
This party fitted out at the Dominion Lighthouse Depot at Prescott and left for its survey ground on May 2 under Capt. Frederick Anderson, who gave over the command to Mr. Bachand on May 15.
The first work undertaken was a survey of Main Duck Island on the approach to Kingston Harbour.
As a result of the survey of Presqu’lle Bay in 1910 a slight rearrangement of the spar buoys was found necessary and made by the survey before taking up regular work, which consisted of a water triangulation from Presqu’lle to Port Darlington, the traversing of the shore between, and the sounding off shore for a distance of about twelve miles. This was carefully done and an accurate contour obtained. In the sounding no shoals were discovered, but the edges of the banks have been determined.
Plans, on large scales, were made of Cobourg harbour and Port Hope.
On November 4 the *Bayfield* returned to Prescott and was laid up for the winter at the Dominion Lighthouse and the crew paid off.
The staff returned to headquarters at Ottawa and were employed all winter in plotting the season’s work and preparing charts for the engraver.

LOWER ST. LAWRENCE RIVER SURVEY.

This party consisted of Commander I. B. Miles, R.N., in charge, with Messrs. A. J. Pinet and G. C. Venn as assistants, and Capt. H. J. McGough as Sailing Master and Mr. D. Marotte as Chief Engineer.

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Its steamer *Cartier* fitted out at the Quebec Agency of the Department of Marine and Fisheries, and after dry docking left for Rimouski headquarters on May 23, with Mr. Charles Savary temporarily in charge owing to Commander Miles having been granted leave of absence until June 1.

Triangulation, traversing and sounding were carried on in the neighbourhood of Bic Island and Father Point, until October 21 when the party returned to Quebec, laid up the vessel and paid off the crew.

The staff returned to Ottawa and spent the winter plotting the season's notes and preparing charts for the engraver.

At the end of the season Mr. G. C. Venn, who had been on the survey since April, 1906, resigned and returned to England. After such a period his retirement was a distinct loss to the survey.

PACIFIC COAST.

This party is in charge of Capt. P. C. Musgrave, who has for assistants Messrs. Louis Davies, O. Parker and R. L. Fortier, with Capt. F. H. Griffiths, Sailing Master and Pilot, and Mr. A. R. Borrowman as Chief Engineer.

On April 4 Mr. O. Parker, who had been first officer on the C.G.S. *Lillooet*, was appointed an assistant on the survey and assumed his new duties at once.

Mr. R. L. Fortier was appointed from the Fishery Protection Steamer *Canada* on May 10 as assistant and joined the staff immediately.

On April 12 Mr. T. W. Allen, who had been Chief Engineer of the steamer since its first commission, resigned and was succeeded by his second Mr. A. R. Borrowman.

On April 11 the steamer *Lillooet* with party on board left Esquimalt for her surveying field, and after coaling at Nanaimo proceeded north to Prince Rupert where she arrived the 16. Work was taken up in Arthur Passage with the view of finishing some work necessary for the completion of the chart of that channel. This was successfully accomplished and the party left for and arrived at Skidegate, Queen Charlotte Islands, on May 5.

Surveying was immediately taken up here, a party, placed in camp, made a new plan of Skidegate inlet showing important differences from the previous chart made in 1866.

The larger party, using the steamer, attempted a triangulation across Hecate strait and the traversing of the east shore of Graham Island from Rose Spit to Cape Chronstcheff, but time did not permit of much sounding being done.

It has been found that the islands are very incorrectly charted and considerably out of position, but the exact amount could not be determined as the signals on either side and necessary for triangulation could not be seen.

The traverse of the shore from Rose Point to Copper Bay, a distance of 70 miles, was successfully completed and a water triangulation of it carried out.

During six weeks in the fine weather of July and August, the steamer moved to the western approach to Dixon entrance and examined several positions in which breakers had been reported, but no sign of doubtful water could be found. Considerable sounding was done in this locality but there yet remains a vast work to complete the channel. Unfortunately the number of fine days available is very limited and it will take many years to finish.

In June several days were taken up in an examination of Nepean sound for the rock upon which the United States steamer *Chicago* was reported to have struck. After a very careful survey over the locality designated by the master of the vessel no indication of it could be found.

On October 26, owing to very urgent requests for a survey of Cousins Inlet, the party was moved to that locality and remained until November 18. Because of heavy rain, snow storms and cold weather very little was accomplished beyond the outlining of the work for the season of 1912, when it is hoped the survey will be completed.

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On the whole the weather in the vicinity of Queen Charlotte Islands during the season has been better than in previous years, but the number of days of rain, fog, and strong winds has been very great, causing serious loss and adding very materially to the cost of the work and the length of time that should be necessary for its completion.

The extent of work to be done in British Columbia is so very great, that the Department should seriously consider the advisability of providing a second vessel, probably smaller, for service in the sheltered waters.

The party returned to Esquimalt on November 20, the steamer was laid up, crew paid off, and the staff moved into office in the H.M.C. Dockyard for the winter to work up field notes and prepare charts for the engraver.

LACHINE RAPIDS.

A small party under Mr. Charles McGreevy, assisted by Messrs. G. B. St. Pierre and E. Jodoin, living ashore and working from a launch, was detailed for revising some work in Lake St. Francis and Cedars rapids.

It afterwards moved to Laprairie and undertook a survey to connect our work in Lake St. Louis with that in Montreal harbour. This consisted of a triangulation and traversing but very little sounding.

The party laid up the launch at Cornwall and returned to Ottawa on November 27.

I regret to say that Mr. G. B. St. Pierre, after many years service, resigned and accepted a position with the Corporation of the City of Montreal, about the end of March.

HUDSON BAY.

This important survey was again prosecuted but with increased vigour as a result of the experience of the previous season.

The work was divided between three parties. The larger under Capt. Frederick Anderson, who has been connected with this survey since 1893, first as assistant to the undersigned for ten years, and then in charge of the work on the Lakes Superior and Ontario for nine years. He had for assistants Mr. Charles Savary, an assistant of six years experience, and Mr. H. S. Windeler, a graduate of Royal Military College.

The Department of Marine and Fisheries kindly loaned us the ice breaker *Minto* in charge of Captain John Macpherson and Mr. Joseph Ferguson, Chief Engineer, both of whom rendered very valuable service.

For navigation through the ice in Hudson Strait the survey was fortunate in again securing the services of Capt. S. W. Bartlett, of Brigus, Newfoundland. This officer's reputation is so well known that it is unnecessary here to pass other remark than that he was again the right man for the position.

The second party was placed on board the schooner *Chrissie Thomey*, sailed by Captain Thomas Gusaue of Brigus, Newfoundland, who again rendered very excellent service. This party was in charge of Mr. H. D. Parizeau, who had had charge of a similar party in the season of 1910 and was assisted by Messrs. Robert Fraser and H. H. Lawson, both of whom had had previous experience in surveying work and were well qualified for their positions.

The third party was equipped for the purpose of securing reliable data concerning the magnetic declination, in Hudson Bay and Strait, both its amount and also the annual change by comparison with observations obtained in 1884 and 1885.

For the purpose the schooner *Burleigh* was purchased and an auxiliary gasoline engine installed for manœuvring during observations at sea.

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The party was in charge of Mr. W. E. W. Jackson of Toronto Observatory, an Officer who had been in the north on a previous expedition. He had for assistant Mr. F. Ashbury, a recent honour graduate of Toronto University. The schooner was sailed by Captain Thomas Butler of Halifax.

She left Halifax on July 18 in tow of the *Minto*, entered Hudson Strait on July 27 and was cast adrift from the steamer on July 28. She stood over for Ash Inlet and Lake Harbour in Baffin Land and on 30 was found to be leaking so badly from frequent buffetting with the ice that Captain Butler feared for her safety and decided to return to Halifax, where he arrived on September 7, and laid up the vessel as the season was too far advanced for a return to Hudson Bay. Repairs were executed at once.

The following observations were obtained by Mr. Jackson:—

SUMMARY OF MAGNETIC OBSERVATIONS.
MADE by Authority of the Department of Naval Service.

Station.	Lat. N.	Long. W.	Date.	DECLINATION.		INCLINATION.		HORIZONTAL FORCE.		Minto.	Remarks.	Declination reduced to Mean of Day.
				L.M.T.	D.	L.M.T.	I.	L.M.T.	C.G.S.			
Porteau..... Green Cove.	51° 27'	56° 55'	July 21	17 23	-31 48.0	17 03	80 27.6	15 29	0.09845	.....	Magnet unsteady....	-31 45.7
	57° 42'	61° 42'	Aug. 15	14 36	-42 26.4	17 25	80 26.5	17 11	0.09795	.....	Deducted from total force.....	-42 8.1
				14 50	-42 24.9					.....		-42 8.7
Halifax.....				15 29	-42 19.5					.....		-42 7.2
				16 06	-42 26.4					.....		-42 16.9
				15 45	-21 34.3					.....		-21 32.4
	44° 36'	63° 34'	Sept. 15	16 09	-21 36.2	17 12	73 50.4	17 02	0.16137	.....	Deducted from total force.....	21 35.1
				17 02	-21 36.1	17 16	73 50.3	17 17	0.16161	.....		-21 36.5
Rimouski.....				17 39	-21 35.3	17 27	73 48.6			.....		21 36.6
				12 07	-23 01.4			12 06	0.13816	.....		22 49.6
	48° 30'	68° 31'	Sept. 18	13 09	-22 59.0	12 30	76 49.4	14 11	0.13828	.....		22 49.1
				13 25	-22 58.1	12 47	76 48.6	12 33	0.14021	.....		22 48.3
				14 13	-22 57.5	15 14	76 49.4	15 10	0.13793	.....	Deducted from total force.....	-22 48.6
				14 49	-22 58.2	15 22	76 48.9			.....		-22 51.3
				15 41	-22 57.7					.....		-22 54.3
			Sept. 19	9 26	-22 52.9					.....	Magnet unsteady....	-22 57.5
			" 20	.....	-22 57.0					.....	Small disturbance..	-22 52.4

(Observations all corrected to Toronto standards.

Observers:—
W. E. W. JACKSON.
F. C. ASHURBY.

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The second party, or that to which the schooner *Chrissie Thomey* was attached:—

On May 15 Mr. Parizeau left Ottawa for Winnipeg and Port Nelson to prepare for the season's work. He left Winnipeg on June 5, Norway House on June 11 and reached Port Nelson on 27. Work was immediately started erecting surveying beacons and a tide gauge which was read day and night whilst the party was at work.

The schooner *Chrissie Thomey* left Halifax on June 27 under her own sail, reached Forteau Bay about July 15 and was taken in tow by the *Minto* on July 20 for assistance through the ice off the Labrador coast and through Hudson Strait.

Her career whilst with the *Minto* is best told by Captain Anderson whose report is attached as an appendix. She arrived at Nelson on August 11 and Mr. Parizeau moved on board, anchoring her as near shore as possible with just sufficient room to swing clear of the banks on either side of the channel. This was about two miles east of the mouth of Root creek where camp had been established by him in 1910.

Upon the arrival of the schooner sounding at the inner end of the Port was proceeded with, working out to meet the main party on the *Minto*.

This was completed and the schooner left for Port Churchill on September 7 to make some necessary repairs to the stem of the schooner (see Captain Anderson's report of the accident) to enable her to proceed to Halifax. She left Churchill on September 23 in tow of the collier *Erik* for passage across the Bay, arrived at Red bay on October 10 for repairs; and Halifax on 25. She was immediately dismantled, crew paid off, and repairs made. The staff returned to headquarters at Ottawa and took up the work of plotting and preparing charts for the engraver.

The main party upon the steamer *Minto* and in charge of Captain Frederick Anderson left Halifax on July 8, and entered Hudson strait with the schooners *Chrissie Thomey* and *Burleigh* in tow on 28. She reached Port Churchill on August 7 and the anchorage off Port Nelson on 11.

The account of the trip by Captain Anderson himself will be found in the appendix to this report. It shows the dangers and trials which ordinary well found vessels may expect in navigating Hudson strait. All our vessels had been strengthened for this, yet all were seriously damaged. The *Minto* which has been in the winter navigation across Northumberland strait for years and suffered very little, had her bow badly damaged by hitting a small piece of the ice which is much harder than that found further south. Had the schooners been bound in for cargo neither could have brought out a ton.

The party under Mr. Parizeau, having erected the necessary signals and completed the traverse of the shores of Port Nelson between Marsh point and Sam creek, Captain Anderson and party were enabled to devote their whole time to sounding the outer anchorage and channel into the Port, which they did very successfully, thus completing an extremely difficult piece of surveying.

The difficulties may be briefly stated as low shores, difficult of approach, scarcity of material on the beach with which to construct marks for surveying, great labour involved in landing instruments and materials from the vessel over mud flats from two to four miles wide, the distance from shore at which the soundings had to be taken, and the short, cold, wet season.

The water was too shallow and too narrow for examination from the high decks of the steamer and boats had to be used from which only short sights could be taken.

To carry out the work a series of large can buoys had to be placed and 'fixed' from shore, these extended out to deep water and with their assistance the positions of the ship and boats were ascertained.

The ordinary surveying boats and launches were found useless in this exposed position and covered launches were built and taken up from Collingwood, Ontario. These proved excellent sea boats, safe and dry.

RETURN.

From September 6 to 20, coaling was carried out from steamer *Erik* at Port Churchill and the *Minto* returned to Nelson to complete a small piece of work. She left on September 28 calling at Sugluk on October 1, at Port Burwell on the 8, Domino Run on 12, to transfer coal to the collier *Erik*, and Halifax, October 17.

On the whole, considering all the circumstances, the Department is to be congratulated on the success of this work. The survey of Port Nelson, a most difficult one, was accomplished and the first chart of it given to the world. As a result of the examination the *Minto* was enabled to enter the channel to the deep water inside the bar, being the largest vessel that had ever done so.

The ship was paid off, re-transferred to the Department of Marine and Fisheries and the officers returned to Ottawa to resume duties in office.

The office staff has continued to render valuable assistance.

The following are the results from magnetic observations with unifilar magnetometer, taken at Churchill by Mr. Charles Savary in 1910:—

SUMMARY OF MAGNETIC OBSERVATIONS.

Taken at Fort Churchill, Hudson Bay, 1910.

Declination	Oct. 10.....	-9 58'·1
	" 16.....	-9 57'·4
	" 18.....	-9 59'·1
	" 19.....	-9 56'·1
	" 22.....	-9 57'·7
	" 24.....	-9 58'·8
	" 25.....	-9 56'·9
	Mean.....	-9 57'·8
Inclination.....	Oct. 15.....	-84 34'·2
	" 18.....	-84 40'·6
	" 21.....	-84 30'·2
	" 25.....	-84 26'·6
	Mean.....	-84 33'·4
Horizontal Intensity.		C. G. S. Units.
	Oct. 17.....	·06002
	" 18.....	·05962
	" 19.....	·06121
	" 21.....	·06105
	" 24.....	·06025
	Mean.....	·06043

PORT NELSON.

Sufficient surveying has been done to enable any one to form some idea of what this place is from a mariner's point of view. There are at least three points to be considered in looking at a port:—How it will answer as a railway terminus, considering the railway only, second: How it will answer the vessels using the terminus, and third: How it will affect the engineers constructing necessary docks, breakwaters, slips and maintaining the harbour.

It is only on the second and third points that the survey is called upon to report.

Port Nelson, situated about Lat. 57 03N., Long. 92 44W. may be called a V-shaped indentation, the point being at the extreme west end, or at Seal islands, and the base of the V being the line from Marsh point to Sam creek, a distance of twelve nautical miles. From Sam Creek to the head it is twenty nautical miles and from Marsh

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Point to the head 22 nautical miles. The shores are all low with a thick growth of small trees, 90 feet high on the inner portion of the harbour, and 15 to 20 on the outer shores. Spring tides rise 17 feet, neaps 11 feet.

The inner part of the harbour is very shallow from Seal Islands to Rock Creek where the Port is $3\frac{1}{2}$ miles wide. The bottom is very uneven and covered with huge boulders that uncover at low water.

Generally speaking the bank facing both sides of the harbour is very shallow (practically dry at low water) but drops suddenly to 18 feet and over.

The northwest shore at Root creek is fronted by this shallow bank for $1\frac{1}{2}$ nautical miles when the deep water from Hudson bay ends.

At Bear creek, $3\frac{1}{2}$ miles further out, the bank is two miles wide and the deep water channel (about 19 feet) barely a mile wide.

In a line from Sam creek to Marsh point the bank is four miles wide, leaving the deep water channel (22 to 40 feet) a little over half a mile wide.

The south shore opposite Root creek has a bank two mile wide, opposite Bear creek the bank is three miles wide, and on the line joining Marsh point to Sam creek the bank is over six miles wide, most of it dry (even at the outer end) at low tide.

To describe the navigable water of Port Nelson is rather difficult, but as not more than 18 feet can be carried over the Bar (6 miles outside the line joining Marsh point and Sam creek) we will call that depth 'navigable water.' Navigable water therefore extends about northeast from a point $1\frac{1}{2}$ miles southeast from Root creek. Two miles from this point the water is only 22 feet and the channel 500 yards wide. East-south-east of Bear creek the channel is half a mile wide and only 19 feet deep. On the line joining Marsh point and Sam creek the channel is half a mile wide but from 18 to 40 feet deep. The channel inside this is slightly wider and very deep (as much as 90 feet). Outside the above line the channel begins to open out and become shoaler forming a bar (inside the 20 foot contour) $3\frac{1}{2}$ miles wide and over which 18 feet may be carried but 16 to 17 is more likely to be found. As there are huge boulders all over the shoaler water it may be expected that the same condition exists on this bar.

The outer edge of this bar lies twelve miles N. by W. $\frac{1}{4}$ W. from Marsh point and $7\frac{1}{2}$ miles E. by N. $\frac{3}{4}$ N. from Sam creek and the edge between the 18-foot contour on each side is $1\frac{3}{4}$ miles wide. Outside this the water gradually deepens there being 5 fathoms 2 miles outside.

The currents in this channel are very strong and of course run in its axis. Measurements were made and in the middle of the flood at springs it was $3\frac{1}{2}$ knots.

At the present time a vessel making Port Nelson has very little to guide her even in clear weather. If she be still in good water the master will pick up the beacon on Marsh Point first when about 15 miles distant. If the weather be thick, a master can only keep his lead going, and stay in water over 7 fathoms deep.

In no case should he bring the beacon to bear to the southward of S. $\frac{1}{2}$ W. in 7 fathoms when he will be 17 miles from the beacon and 9 miles from the shore to the westward.

Without local knowledge or a pilot he can proceed no further, and even then buoys must be placed. With the establishment of a town, elevators, churches, buildings and smoke, conditions might be improved, but from a mariner's point of view the outlook at Nelson is not good. He must have a beacon to show him the entrance to the channel and buoys to guide him in it. These will be possible in fine weather but quite unreliable when the ice starts to form in the autumn or when running in the spring.

Over the bar he will have none too much water under him and will still be exposed to the full sweep of the sea. In this exposed locality it will be difficult for the mariner to keep in a dredged cut and for the engineer to maintain it.

Inside the bar, whilst he will have deep water he will have strong currents to contend with and none too much room in which to swing at anchor and very little shelter from sea and none from the wind.

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HARBOUR WORKS.

It would look as if these should be placed at Bear Creek or between it and Root Creek and that the wharves and slips must be under the lee of a breakwater inside and clear of the channel in which no works should be constructed because they would contract the passage and cause trouble.

Comparison of Churchill and Nelson harbours. The surveys of these harbours are of sufficient accuracy and detail to warrant a comparison from a mariner's point of view. Churchill is small as may be seen from its description in last year's report of the Department of the Naval Service, the area of water over 18 feet deep being about half a square mile and of sufficient size for three or four vessels, but the anchorage space, no more exposed than that at Port Nelson, is unlimited. The shores lend themselves for the cheap and easy construction of wharves and slips.

The shelter is good from both wind and sea and the harbour can easily be enlarged by the construction of a breakwater, with lock in it, from Cockles' point to the east shore thus forming a basin above in which the water can be held at H.W.O.S. and afford ample draft for moderate vessels. This breakwater would kill the strong currents and tide rips now experienced in ebb tides, and afford means of carrying the railway to the west side of the harbour where, in addition to those on the east side, wharves can be constructed in the tide flat. As time goes on and trade increases the harbour can be enlarged by dredging the middle ground.

The harbour is easily picked up from the offing and vessels can come close in to look for it in moderately thick weather.

Any dredging done in Churchill will be of a permanent character, and if of rock, can be utilized for the necessary filling-in in the construction of the wharves and piers. The space for wharves is quite as good as in Nelson for less money.

Referring to Port Nelson, it is difficult of approach and hard to pick up. This may be remedied by light ships and gas buoys and the creation of a town, but it can never rival the easy access of Churchill.

The channel in is long and not deep, it is none too wide and is rendered troublesome by strong currents.

All piers have to be constructed a long distance (2 miles) from dry land, and rock filling must be brought long distances. Anchorage in the long channel is unsafe and the landing of supplies to start work will be costly and dangerous.

Dredging in soft material and boulders will be costly, the outer bar is very much exposed and the proposed harbour will have little shelter from wind.

During the season the following new charts were issued:—

No. 71.—Presqu'ile Bay.

“ 98.—Cove Island to Duck Island.

“ 204.—Bic Island to White Island.

“ 205.—South Traverse (St. Lawrence river). Churchill Harbour.

A second edition of the following charts was also issued during the year:—

Berens River to Nelson River (Lake Winnipeg).

Red River to Berens River (Lake Winnipeg).

No. 72.—Goderich Harbour.

“ 1.—Montreal Harbour.

“ 17.—Portneuf to Cap Santé.

“ 18.—Ste. Croix to St. Antoine.

I am, sir,

Your obedient servant,

WM. J. STEWART,

Hydrographer.

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OTTAWA, January 9, 1912.

W. J. STEWART, Esq., C.E.,
Chief Hydrographer, Dept. of Naval Service,
Ottawa, Ont.

SIR,—I beg to submit the following report on the work of the survey in Hudson bay and strait during the season of 1911, also a general description of the trip up and the return journey in the autumn.

The C.G.S. *Minto* and schooners *Chrissie Thomey* and *Burleigh* were fitted out for the work at Halifax during the latter part of June and the beginning of July and sailed on July 8 arriving at Sydney at noon on the following day.

After coaling the *Minto* cleared Sydney on July 18, with the *Burleigh* in tow, carrying 40 tons of coal to be transferred later to the *Minto*. Besides the ship's company the *Minto* had two passengers on board, the Rev. Messrs. Peck and Broughton, both missionaries bound for Lake Harbour in Baffin Land on the north shore of Hudson Strait, the supplies for these missions being on board the schooner *Burleigh*.

The *Minto* called at Forteau Bay on the Labrador coast on July 20 to pick up the *Chrissie Thomey* also bound for Port Nelson, and the coaling steamer *Beatrice*. This fleet having assembled, the harbour was cleared on the morning of 22, the *Beatrice* towing the *Burleigh* and the *Minto* the *Chrissie Thomey*.

The weather was very thick with a heavy roll from the southeast and many scattered icebergs were passed. We swung ship off Battle harbour and found the standard compass good.

Sunday, July 23, was very thick accompanied by rain, fresh wind and heavy swells from the southeast.

At 8 a.m. we were about 25 miles off Sandwich bay with a few icebergs and no field ice in sight.

When about 25 miles off Indian harbour and at 10 p.m., a report was sent to Ottawa by wireless, as this was the most northerly wireless station in operation and therefore the last point through which communication could be sent before proceeding farther.

On the following morning there still remained a heavy southeasterly swell and the weather was very foggy and many scattered icebergs were passed during the day. The *Beatrice* with the *Burleigh* in tow had dropped to about five miles astern. Noon observations placed us about 65 miles off.

On Tuesday the 25, the first ice was met about 25 miles off Cape Mugford. It was not at all heavy nor closely packed and the *Minto* with the *Chrissie Thomey* in tow, took it easily. It is impossible to state how far this ice extended off shore, but from aloft no clear water could be seen ahead or to the eastward.

Under these conditions the captain of the *Beatrice* refused to proceed but wished to heave to until the ice cleared away, and then make the bay, but this arrangement was considered too indefinite and uncertain, as coal was a most serious consideration to us. Accordingly the *Beatrice* turned back with instructions to report to Ottawa from the nearest wireless station. The *Minto* took both schooners in tow. Navigation in ice is difficult enough when alone, but much more so when hampered with two vessels in tow, yet good progress was made.

No coal was taken from the *Beatrice* as I considered the *Minto* was quite low enough in the water for the ice usually met with in Hudson Straits. The lower edge of the cargo doors was about two feet below the surface of the water and it would be

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a very serious matter if one of them was damaged in the ice. These doors were backed by cement and strengthened considerably, which proved to be a good precaution because after returning to Halifax the port door was found to be considerably sprung by the ice, but not sufficient to cause any leak.

During the following night a field of very heavy arctic ice was encountered and we hove to until daylight not caring to risk entering it.

On July 27 we were off Cape Chidley and though it was very thick we got a glimpse of the Button islands and fixed our position. The ice was fairly heavy, probably arctic ice from Davis strait, but not too closely packed for making headway with caution and two vessels in tow. At 4.30 a.m. the *Burleigh's* tow line was parted by fouling a large pan of ice although the *Minto* was steaming very slowly.

We had only one tow line, a ten-inch hawser about 120 fathoms long, and this line was made fast to the *Chrissie Thomey*. When we took hold of the *Burleigh* a wire cable was used and she paid out about 15 fathoms of chain thus helping to take any sudden strain off the wire. The chain parted near the schooner and it was a very difficult operation hauling in the wire about 15 fathoms of $\frac{3}{4}$ -inch chain attached to it, and complicated by a heavy roll.

The *Burleigh* was brought abreast the *Chrissie Thomey* and a large pan of ice secured between the vessels to hold them apart. After a delay of three hours the break was repaired and we proceeded on our journey.

While engaged in this operation the steamer *Beothic* from St. Johns, Newfoundland, and chartered by the Hudson Bay Co. to carry Canadian supplies to York Factory and James Bay, hove in sight and stood over towards us. She reported that this was the first ice met with and proceeded on her journey, hauling considerably to the north before starting into the strait.

Later in the morning the *Burleigh's* chain parted again, but as the break was only a short distance from the wire it caused a delay of about thirty minutes. Many large bergs were seen, but after passing the entrance to the strait we had it fairly clear for some hours.

At 4 a.m. on July 26, when about thirty miles off Savage island, we entered another flow of arctic, probably from Gabriel Strait. Although the ice was very heavy and closely packed the field was narrow and we pushed slowly through without much difficulty. On clearing this ice the speed was increased to about eight knots until noon when ice was again met with about thirty miles off Icy Cove.

On this occasion also it proved to be arctic ice, some very large pans closely packed together in places. Fair leads could be picked out from the masthead but there was no clear water visible. All went well for some time as we pushed our way through very slowly stopping occasionally to allow the two schooners to clear pans that swung back again into the track made by the steamer.

At about 1.30 p.m. we glanced off a large pan which it was impossible to avoid and the starboard anchor caught tearing away the hawsepipe and considerably damaging the plates near by. With the ship in this condition it was out of the question to proceed further and we hove to, making fast to a large pan as it afforded considerable protection for repairs.

On examination it was found that the hawsepipe was completely shattered and must be removed. In this connection I wish to state that the chief engineer and his staff and our excellent gasoline engineer, Whelan, deserve credit for the manner in which the damage was repaired. We had very little material on hand, an old iron door being used for a patch. The most was made of everything available and a first class piece of work done. We further strengthened the bows on the inside with concrete and timbers to avoid any chance of future trouble in this quarter.

At this time the *Chrissie Thomey* was reported to be damaged and making water fast. The fore foot had been carried away by ice. The *Burleigh* towing astern of her caused her to steer badly and made it very difficult to avoid stray pieces of ice.

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The schooner was brought alongside and cleared of water by steam pumps. A spare fore sail was then stretched under the bow and drawn up as tightly as possible on either side when quantities of ashes were thrown into the sail from the *Minto* and the suction produced by the leak almost stopped it in a few hours. This was most satisfactory as the situation began to look serious.

In the evening we parted company with the *Burleigh* having transferred the missionaries to her, the Rev. Mr. Peck and Mr. Broughton, bound for Lake Harbour in Baffin land, about forty miles distant. It was very fine and calm and the ice appeared very light and open towards the shore as far as could be seen from the crows nest.

We were fortunate in having fine weather for our repairs; the thermometer stood at 26 F. at 7 a.m. on Sunday, July 30, the rigging being covered with a heavy coating of ice. The engineers were working all day at repairs. By noon observation it was found that the ship had drifted about thirteen miles to the northwest in twenty-four hours, and we were surrounded again by arctic ice, some very large pans, in fact small icebergs.

On Monday, July 31, the wind was south, frosty and cool with heavy ice drifting past. The crews were engaged in trimming coal aft to bring the ship up as much as possible forward and therefore in better shape for the ice.

Repairs being almost completed steam was taken at 3 p.m. From the crows nest, as the ice appeared very light towards the southwest, we held in that direction making clear water in a short time and stood over for Wakeham Bay. The weather was foggy but we managed to pick up Wales Island, which is high and bald and easily distinguishable, at 2.45 on the following morning, arriving off Wakeham Bay an hour later.

Wakeham Bay is well marked by a rather remarkable cliff almost perpendicular and about 1,000 feet high forming the eastern entrance point, whilst the west side has a similar steep cliff, but hardly so prominent.

In making the entrance we left two small rocks, that lie about two miles off shore, dry at half tide, about $\frac{1}{4}$ mile to starboard and stood in until the entrance which is not visible from outside opened up. We entered in about mid channel in which was a depth of over 20 fathoms. The bay is about half a mile in width at the entrance increasing to three or four miles inside and extending in some miles into an inner bay. Good anchorage was found in 17 fathoms over mud bottom off Revillon Frères fur trading post and about one mile off shore. The bay affords good shelter both from wind and sea as it is surrounded by hills of from 500 to 1,000 feet in height. Good fresh water can be procured by boats from some streams.

Mr. Derome, the officer in charge of Revillon Frères post, reported that the season was three weeks at least backward and that the fur trade was very light during the past winter. He expected the Company's boat in a month's time. We met our first Eskimo here, two of them came out to meet us in kayaks while entering the harbour. I was informed that no Eskimo live here permanently, they only come for the purpose of trading and then leave to procure more furs.

We landed before breakfast and were lucky in finding a suitable place to beach the *Chrissie Thomey*. It was important to have a place selected, marked by ranges and all the boulders removed before flood tide that no time would be lost in placing the schooner. Early in the afternoon the *Chrissie Thomey* was beached and later in the afternoon on examination the cut-water or lower part of the stem was found badly damaged, and by cutting away the splinters it developed that the stern had been split by bolts driven from the inside while building, causing a leak that could never be located. The damage was repaired as well as possible with the material and tools available and she was found in fair condition when floated.

August 2, being a very fine morning, we took an observation of the sun for time, but the sky clouded over by noon preventing further work. We cleared Wakeham Bay at 6.30 p.m., the weather being very thick, but calm and no ice in sight.

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On the following day it was raining and thick light fields of ice were met with off Charles Island, after passing which we hauled in for the south shore of the strait making it about Sugluk and coasted along about half a mile off where a fair passage was found. Occasionally heavy ice was met with, but farther off shore heavy and closely packed fields could be seen. Digges Island was passed at 8 p.m. and about midnight we ran into a field of arctic ice between Digges and Mansel Islands which had come down from Fox Channel. The weather was very thick and the ice closely packed so we made fast to a large pan as it was impossible to pick out any leads through which we might make a safe passage.

On August 4 the fog was very dense and we were hove to all day not considering it safe to make a move under the conditions. However, a little before sundown steam was taken on the chance of the fog lifting. It was remarked that the weather which would be thick all day would lift suddenly at sundown and finally close in again a little later. On this occasion that took place and being ready we made good headway and were lucky enough to completely clear the ice before the fog closed in again. This was the last ice met with for which I was very thankful and we arrived at Port Churchill at 8 a.m. on 7.

While crossing Hudson Bay the weather was fine but foggy. The magnetic variation in this locality changes so rapidly that we were obliged to alter the ship's heading one degree per hour to hold the course. Our standard compass, which has been placed on board where it would be least affected and therefore require little adjustment was a great comfort. It was hardly affected by the comparatively close proximity of the magnetic pole and proved very efficient.

When about fifteen miles off Port Churchill the place was easily recognized from the R.N.W.M.P. barracks, which, painted white, showed up well and a little later Eskimo beacon was sighted.

Churchill is easy of approach as good water will be found fairly close in. On entering the *Minto* held too much to the westward and as the tide was on the ebb she took a shear when abreast of Fort Prince of Wales and rubbed the bottom two or three times but with no serious results. We came to anchor in 30 feet of water over sand bottom about three quarters of a mile off shore abreast the sight of the old Battery beacon.

We were very cordially received by Major Starnes, Officer in charge of the R.N. W.M. Police, and Mrs. Starnes, who have very comfortable quarters at the barracks. Major Starnes reported that the weather had been very bad and unsettled so far this season and that a large snow bank lay near by until the middle of July.

During the day the beacon brought up to replace the old Battery beacon was landed near the original site of the latter on the east side of the harbour. Major Starnes took charge of it and agreed to have it erected by his men as opportunity offered, the men's time for the work performed to be charged against the Department of Marine and Fisheries.

The survey stores left in charge of the Mounted Police in January, 1910, were taken on board, the large launch being placed on the main deck forward and securely lashed. Major Starnes very kindly allowed us the use of his launch to facilitate matters.

On August 9 there was a full gale from the west accompanied by rain. We did not venture out considering it wiser to await more favourable opportunity for a first introduction to Port Nelson. The following morning we left Port Churchill with the schooner *Chrissie Thomey* in tow, arriving off Port Nelson, at 7 a.m. next day, August 11.

On leaving Port Churchill the *Minto* held N. 15 E. for eleven miles to clear the shoals making out from the north side of Cape Churchill thence E. by N. for thirty miles before shaping course for Nelson giving Cape Churchill a berth of ten miles and apparently clearing Nelson shoal by over fifteen miles. The weather was overcast but

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fine and clear. At about 4 a.m. the submarine sentry set at 15 fathoms struck the bottom and on sounding 12 fathoms was found. The speed was reduced and a little later finding 9 fathoms of water we hauled off considerably before coming back on our course and passing about 5 miles off Nelson shoal. This would seem to indicate that the coast along here is apparently charted some miles too far to the westward, and on this account great caution should be exercised to make good use of the lead when using the present chart.

When Cape Tatnam was picked up we were heading about 10 miles inside its extreme. Our course was steered until about 5 miles off the cape then changed to southwest into Nelson Roads. The beacon on Marsh Point was picked up when at a distance of about 15 miles and a little later the *Minto* came to in 5 fathoms with the beacon bearing S.S.W., distant 6 miles, but as the tide was found to be falling this was considered too shallow and a move of a couple of miles was made.

During the period August 11 to September 7 surveying operations were carried on in this locality with varying success.

We left Nelson on the latter date for a fresh supply of coal at Churchill, after which, on September 21, we returned to Nelson. Operations having to be carried on many miles off shore with no protection from any wind it was found most difficult to accomplish much. It is reported that after September 15 the weather is very broken with frequent heavy winds and snow squalls. The agent at York Factory reports that a heavy swell from the eastward always prevails during the autumn and this was our experience making it impossible to land except many miles inside Nelson roads.

On the morning of October 28 there was a heavy swell from the east, the sky was overcast and threatening, and as only a sufficient supply of coal remained to ensure a safe passage to Sydney, we decided to say goodbye to Nelson for the season. Although the *Minto* was rolling considerably no difficulty was experienced in lifting the buoys which had been placed for surveying operations but for the large launch it required very careful handling of the vessel. About 2 p.m. everything being secured, we squared away for Hudson Straits.

On the trip across Hudson Bay head winds and heavy seas were encountered and we were obliged to run at a very slow rate of speed as the *Minto* was trimmed by the head by the extra supply of coal carried, which had necessarily been all placed forward of amidships. Frequently heavy seas broke over the bridge deck endangering the launch on the main deck forward. We arrived off Digges Island in the western entrance to Hudson Straits on Sunday morning, October 1. On the passage frequent snow squalls were the order of the day, but no ice was met with although we passed south of a large field off the south side of Coats island.

The fore peak of the *Minto* leaked so badly that the crew were transferred to the second class quarters aft. Probably the deck forward was considerably sprung and opened up while at anchor during the last period at Nelson.

The shore from Digges Islands to the eastward is bold and apparently has good water close in. We coasted along at about one mile distant through frequent snow squalls.

We arrived off Sugluk at 3 p.m. and came to about 10 miles up the bay late in the afternoon in 14 fathoms of water over clay bottom.

Sugluk harbour is on the south shore of Hudson Strait and about midway between Digges Island and Cape Weggs. It is easily recognized by a considerable depression in the coast with an island in the middle of it, which in this locality is made up of a succession of high bluffs. On the southeast side of the entrance will be seen a steep cliff about 500 feet high and when closer in a large rock will be seen perched on the edge of the cliff.

The harbour is a long indentation one mile wide at the entrance and running in a southwesterly direction a distance of about 13 miles with a width of from $1\frac{1}{2}$ to 2 miles. A bar over which 8 fathoms may be carried extends across the mouth and

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inside a depth of from 50 to 60 fathoms will be found. There is limited anchorage behind the island in the mouth from 10 to 15 fathoms over and bottom, but possibly considerable swell enters during a northeasterly gale.

Good anchorage and shelter is available about one mile east of Blake Point, a prominent dark point about 4 miles inside the entrance in from 15 to 20 fathoms over mud bottom. Northeast of Blake Point the shore is lined with boulders at low water but in places they do not extend out very far and a small dock for landing coal could easily be arranged. Anchorage can also be had in 15 fathoms with mud bottom about 10 miles up the bay abreast a steep rocky cliff with a low gravel bank at the water edge. Care should be taken not to shoal to less than 12 fathoms as beyond this the bottom comes up very rapidly to a boulder bar that extends across the harbour with 3 feet least water over it at low water. Beyond this bar the bay extends a further 3 miles with a width of 2 miles and a depth in the middle of 30 fathoms.

Fresh water can be obtained in many parts of the bay and at Black point it will be found running off the face of the rock cliff where a vessel can tie up.

During the period spent in Sugluk harbour the weather was very unsettled, heavy winds from the northeast and frequent snow squalls being the order of the day. The thermometer registered 24 F. in the early mornings and about 27 F. to 30 F. at noon. A sketch survey of the harbour was made and many soundings taken.

On the morning of October 5 the weather appeared to have made a change for the better, the sun actually came out for some time. The morning was spent finishing up the survey of the harbour and taking on fresh water, and observations of the sun were taken for time and latitude at Black point. Sugluk harbour was cleared at 2 p.m. and though fine and clear inside it was very thick and disagreeable outside.

The weather cleared shortly before sundown and we were enabled to cut in the east end of Charles Island and also Cape Weggs. The distance between the above points was found to be 10 miles instead of 30 miles as shown on the chart, and Cape Weggs is charted many miles too far to the southeast. No indication of King or Joy Islands was found. When abreast of the east end of Charles Island departure was taken for Big island course S. 35 E. The night was fine and calm though overcast and it was possible to see a distance of some miles. At daylight it was found that the current had swept us some distance out of our course to the southward and we were obliged to haul up S. 58 E. for the entrance to Lake Harbour which is just east of Big island, where we arrived at 10.30 a.m.

Word had been received while we were at Churchill from the Rev. Mr. Peck that the missionaries at Lake Harbour were without supplies and would likely perish during the winter if not assisted or taken home. When about 10 miles off the entrance to the harbour the whaler *Acture* from Dundee, Scotland, and under the command of Capt. Murray was met with having just left Lake Harbour. He reported that provisions had arrived in due time for the missionaries, that they were well supplied for the winter, and that therefore no assistance was necessary. Capt. Murray was homeward bound and expected to make Dundee in three weeks time. He had a cargo of whale bone and walrus hides valued at about \$20,000.

This was an ideal day, calm and warm, though it was October 6, too good for this time of year as it proved. During the afternoon the weather grew very threatening and next morning we had easterly winds, snow squalls and fog, which continued for some days. The ship's position was fixed by noon observations off Lake Harbour and it was found that the coast line to the eastward or about halfway between Icy Cove and Icy Cape was charted about 5 miles too far north, and we were obliged to stand out of the bay some distance before shaping course for Port Burwell. Occasional icebergs were passed, one very large berg about $\frac{1}{2}$ mile square, 75 feet high, off Lake Harbour.

October 7 was a very disagreeable day, southeasterly winds, very thick and frequent snow squalls, 29 F. at 8 a.m. The day was spent drifting about the entrance

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to the strait trying to get a glimpse of the Button Islands. On Sunday, the following morning, the weather was very little better, however we sighted the Button Islands at 9 a.m. and came to in Port Burwell harbour at 3.30 p.m. in 10 fathoms of water over mud bottom.

At present it is difficult to pick up the entrance to Port Burwell but if a proper beacon were erected on the west side of the entrance where a small stone cairn at present stands, it would simplify matters very much. Approaching Port Burwell it is much safer to make the land to the northward, which is bold, and then stand fairly close in until the entrance to the harbour is picked up, but to the southward the shore looks foul and should get a wide berth. Therefore care should be taken not to pass the entrance when approaching from the northwestward.

The entrance to the harbour is about half a mile wide and although there is a spot with 2 fathoms least water on it a short distance off the west side, a vessel is perfectly safe in mid channel.

On opening the harbour two low diamond-shaped beacons will be seen, the front one built on a low rocky point and the back beacon a short distance to the rear on the side of the steep bank. These beacons in line clear the shoal off the west entrance. However they can be kept open a little to the eastward and come to when the lattice work beacon erected on the west side of the harbour becomes visible from the bow in 16 fathoms of water.

Anchorage can also be found further up the harbour between a peninsula at the north end and a small rock awash at high water, but the space is limited by shoal water that comes out some distance off the peninsula.

Burwell harbour gives good shelter from most winds but it would be uncomfortable in a gale from the southwest. Fresh water can be very easily obtained by boats from a stream in the northeast corner of the harbour.

There is a Moravian mission station behind the peninsula on the northwest corner of the harbour, and several Eskimo families live there. Mr. Simons, the missionary in charge, came on board upon our arrival. He reported that the *Arctic* under Capt. Bernier had been there a few days about a month previous.

At Burwell we received a supply of ptarmigan and codfish which was very acceptable, being the first fresh meat received for many a long day. Strong winds accompanied by snow squalls prevailed, but we sounded out the harbour and took on a supply of fresh water.

The weather appearing to clear and moderate on Oct. 10, we departed at noon, in time to catch the ebb tide which runs about 7 knots through Grey Strait.

The northern Button Island appears some miles further to the westward than the position given it on the chart.

Cape Chidley is easily recognized when 10 or 15 miles off. It is bold and very high and the land is very hilly in the vicinity although the Button islands are fairly high and stand well off shore, they cannot very well be mistaken.

When clear of Cape Chidley we were very fortunate in finding it fairly calm, wind northeast, which helped us along nicely. Scattered icebergs and an occasional large one, but no field ice, were seen. Indian Harbour wireless station was picked up at 7 p.m. on October 11 and arrival reported to Ottawa.

On the evening of 11 word was received that the coaler *Erik* was in Domino harbour out of coal and requiring assistance. She had left Churchill about Sept. 23. Domino harbour was reached at 11.30 a.m. on Oct. 12 and tied up alongside the *Erik*. A few tons of coal were transferred and we relieved her of a 33 foot launch which she had taken on board at Churchill at my request, considering it unsafe to carry both launches on the main deck of the *Minto*.

For the next two days there was a full gale from the north accompanied by snow. The holding ground in Domino proved poor, the *Minto* dragging badly, and we had some difficulty in finding a place in which to take hold.

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The *Minto* left Domino on Sunday morning, Oct. 15 making Sydney about midnight on Monday. We left Sydney at noon on Tuesday arriving at Halifax on Wednesday morning.

I have the honour to be, sir,
Your obedient servant,

(Sgd.) F. ANDERSON,
Officer in charge of Survey.

OTTAWA, March 31, 1912.

The Deputy Minister,
Department of the Naval Service,
Ottawa.

SIR,—I have the honour to present the annual report of the Radio-telegraph Branch of the Department of the Naval Service for the year ending March 31, 1912. The following list gives the names of all the land stations now in operation in the Dominion, their owners, and by whom operated.

COAST STATIONS FOR COMMUNICATION WITH SHIPS.
EAST COAST.

Name.	Where Situated.	Owned by.	Operated by.	Range in Nautical Miles.
Belle Isle, Nfld.....	Belle Isle Straits... ..	Dominion Government.	Marconi Wire- less Tel. Co. of Canada.	250
Pt. Amour, Nfld	"	" ..	" ..	150
Pt. Riche, Nfld.....	Gulf of St. Lawrence.....	" ..	" ..	250
Harrington, P.Q.....	"	" ..	" ..	150
Heath Pt., P.Q.....	Gulf of St. Lawrence (Anti- costi Isld.)	" ..	" ..	250
Cape Ray, Nfld.....	Cabot Straits	" ..	" ..	350
Cape Race, Nfld.....	North Atlantic ..	" ..	" ..	400
Grindstone Island, P.Q.....	Gulf of St. Lawrence (Mag- dalen Isld.)	" ..	" ..	200
Fame Pt., P.Q.....	Gulf of St. Lawrence....	" ..	" ..	250
Clark City, P.Q.....	"	" ..	" ..	250
Father Pt., P.Q	River St. Lawrence	" ..	" ..	250
Grosse Isle, P.Q.....	"	" ..	" ..	100
Quebec, P.Q	"	" ..	" ..	100
Three Rivers, P.Q	"	" ..	" ..	150
Montreal, P.Q	"	" ..	" ..	200
Cape Sable, N.S.	North Atlantic	" ..	" ..	250
Partridge Isld., St. John, N.B.	Entrance St. John, N.B., Harbour.	" ..	" ..	250
Cape Bear, P.E.I.....	Northumberland Strait....	" ..	" ..	150
Pictou, N.S	"	Marconi Wire- less Tel. Co. of Canada.	" ..	100
North Sydney, C.B.....	North Sydney, C.B.	" ..	" ..	100
Camperdown, N.S.....	Entrance to Halifax Har- bour.	" ..	" ..	250
Sable Island, N.S	North Atlantic	" ..	" ..	300

GREAT LAKES.

Port Arthur, Ont	Port Arthur, Ont	Dominion Government.	Marconi Wire- less Tel. Co. of Canada.	250
Sault Ste. Marie, Ont.....	Sault Ste. Marie, Ont.....	" ..	In course of erec- tion.	300
Tobermory, Ont.....	Entrance Georgian Bay....	" ..	" ..	300
Midland, Ont.....	Georgian Bay	" ..	" ..	300

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COAST STATIONS FOR COMMUNICATION WITH SHIPS—Continued.

WEST COAST.

Name.	Where situated.	Owned by	Operated by	Range in nautical miles.
Victoria, B.C.	Victoria, B.C.	Dom. Govt...	Dominion Govt..	250
Pt. Grey, B.C. (Vancouver)....	Entrance Vancouver Harbour.	"	"	150
Cape Lazo, B.C.	Srtait of Georgia, near Comox, B.C.	Dominion Government.	Dominion Govt..	300
Pachena Pt., B.C.....	West Coast Vancouver Ild.	"	"	300
Estevan Pt., B.C.....	"	"	"	150
Triangle Ild., B.C.	South of Hecate Str.....	"	"	350
Ikeda Head, B.C.	South of Moresby Ild., Q.C.I.	"	"	250
Dead Tree Pt., B.C. ...	South of Graham Ild., Q.C.I.	"	"	150
Prince Rupert.....	Digby Ild. Entrance Prince Rupert Harbour.	"	"	250

LICENSED STATIONS.

Long Distance.

Glace Bay, C.B.	Near Glace Bay, C.B....	Marconi Wireless Tel. Co. of Canada.	Marconi Wireless Tel. Co. of Canada.	3000
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PRIVATE STATIONS.

Toronto, Ont.....	Toronto, Ont	Goodyear Tyre and Rubber Co., Toronto	Owners.....	56
Bowmanville, Ont.....	Bowmanville, Ont.....	"	"	50
Bowen Ild., B.C.....	Bowen Ild., B.C., Strait of Georgia.	Canadian Explosives Co., Montreal.	"	30

AMATEUR AND EXPERIMENTAL STATIONS.

Eleven stations (detailed list given in report).

COAST STATION SERVICES.

The above coast stations handled business as follows during the year:—
STATEMENT of total number of messages handled by Canadian Coast Stations during
fiscal year 1911-12.

Service.	Number of Messages.	Number of Words.
East Coast.....	119,049	1,824,450
Great Lakes (Port Arthur Station only).....	1,043	17,095
West Coast.....	76,158	997,900
Total.....	196,250	2,839,445

COMPARATIVE STATEMENT of total business handled by the Coast Station Services
during the last 3 years.

Service.	1909-10.		1910-11.		1911-12.	
	Messages.	Words.	Messages.	Words.	Messages.	Words.
East Coast	65,608	956,370	71,594	1,179,434	119,049	1,824,450
Great Lakes (Port Arthur).....	nil.	.....	nil.	.....	1,043	17,095
West Coast.....	18,469	265,414	48,074	647,461	76,158	997,900
Totals... ..	84,077	1,221,784	119,668	1,826,895	196,250	2,839,445

DETAILED STATEMENT of business handled by individual Coast Stations during year
1911-12.

WEST COAST SERVICE.

Nine stations owned and operated directly by the Department of the Naval
Service.

GREAT LAKES.

One station owned by the Department of the Naval Service and operated by the Marconi Wireless Telegraph Company of Canada, Limited.

Three stations owned by the Department of the Naval Service now in course of erection.

Name.	Govt. Station Business.	Words.	Private Business between Stations.	Words.	Re-transmitted Messages.	Words.	Paid Messages to and from Ships.	Words.	Service Messages.	Words.	Messages to and from Govt. Ships.	Words.	Revenue.	Cost of Main- tenance.
Port Arthur, Ont. ....	.....	.....	937	15353	.....	.....	73 11-8	33	554	.....	....	.....	\$500 00	\$3,595 20
Sault Ste. Marie, Ont.	} Not yet in Operation.													
Tobermory, Ont.														
Midland, Ont.														

Total number of messages handled.....	1,043
" " words "	17,095
" cost of maintenance.....	\$3,595 20
" revenue	\$500 00

TABLE No. 2.

EAST COAST.

22 stations.—18 owned by the Department of the Naval Service.

4 owned by the Marconi Wireless Telegraph Company of Canada, Limited, all operated by the latter company under contract with the Department of the Naval Service.

TABLE No. 3.

MARCONI WIRELESS TELEGRAPH COMPANY OF CANADA, LIMITED.

Statement of Traffic for the year 1911-12.

Name of Stations.	Private business to and from ships.		Private business between stations.		Business to and from Government ships.		Government business between stations.		Service messages.		Retransmitted messages.		Traffic carried for Cable Company.		Cost of Maintenance.
	Mess-ages.	Words.	Mess-ages.	Words.	Mess-ages.	Words.	Mess-ages.	Words.	Mess-ages.	Words.	Mess-ages.	Words.	Mess-ages.	Words.	
Halifax-Sable Island.	5,548	51,120	4,298	52,439	78	1,031	835	7,425	2,139	35,020	.....	.....	.....	.....	3,500 00
Halifax-Cape Sable.	2,537	21,455	.....	.....	38	577	128	1,260	1,665	33,497	.....	.....	.....	.....	.....
Halifax Station.	109	1,146	3,087	47,810	220	3,264	1,005	10,252	3,497	65,072	.....	.....	.....	.....	3,500 00
St. John.	106	1,532	301	11,550	515	7,277	96	925	376	6,233	1	60	.....	.....	1,750 00
North Sydney.	57	787	2	46	289	5,017	1,495	9,626	884	11,211	.....	.....	.....	.....	3,500 00
Cape Race.	4,363	43,798	.....	.....	67	1,479	.....	.....	2,389	30,810	.....	.....	.....	.....	3,500 00
Cape Ray.	164	1,903	900	11,560	18	241	1,308	8,371	2,141	31,585	344	5,398	.....	.....	3,500 00
Magdalen Islands.	9	253	1,440	42,243	48	927	125	3,018	812	11,233	129	2,384	.....	.....	1,200 00
Pictou.	30	757	810	31,876	623	11,116	141	2,301	272	7,466	5	84	.....	46,571	1,750 00
Cape Bear.	7	75	101	2,276	684	13,647	46	636	104	2,307	327	5,231	2,390	46,571	2,500 00
Belle Isle.	508	6,865	47	696	274	3,922	1,672	16,558	2,507	35,599	2,978	41,350	.....	.....	4,500 00
Point Amour.	231	9,549	244	2,410	176	3,435	987	10,101	1,686	16,546	4,813	70,557	.....	.....	3,500 00
Heath Point.	381	12,783	67	1,256	169	2,306	398	4,006	3,849	37,147	9,761	148,301	.....	.....	3,500 00
Paine Point.	647	28,033	809	18,195	431	6,845	2,349	21,132	6,189	102,090	526	8,956	.....	.....	3,500 00
Clarke City.	15	285	1,706	50,820	76	1,465	30	384	1,264	17,242	1,845	33,591	.....	.....	3,500 00
Father Point.	744	10,490	1,442	40,632	399	5,498	399	3,935	2,512	40,491	246	7,780	.....	.....	3,500 00
Point Rich.	61	1,005	19	197	52	753	9	159	752	9,166	4,725	74,641	.....	.....	3,500 00
Grosse Isle.	28	557	97	1,468	431	7,375	1,200	23,389	366	8,339	62	1,179	.....	.....	2,500 00
Harrington.	25	395	39	589	11	204	244	1,277	331	3,731	226	3,246	.....	.....	2,500 00
Quebec.	319	4,720	175	2,238	475	8,440	826	12,449	1,298	29,777	217	3,035	.....	.....	2,500 00
Three Rivers.	206	2,614	6	122	320	4,594	1	23	320	5,457	1,137	15,598	.....	.....	3,500 00
Montreal.	165	1,955	366	3,313	73	1,172	6	204	610	9,183	.....	.....	.....	.....	3,500 00
Totals.	16,260	205,080	15,959	324,676	5,461	90,525	13,270	137,431	35,953	552,202	27,348	421,394	4,798	93,142	61,200 00

Total number of messages handled. 119,049.
Total number of words handled. 1,824,450.
Total cost of maintenance. \$61,200.

COAST STATION SERVICE OPERATION GENERALLY.

The Coast Station service has been maintained and operated at the general high standard of efficiency and the increase in the number of words handled (1910-11, 1,826,895 words, 1911-12, 2,851,350 words) is very satisfactory.

On the West Coast a great increase is noted in the inter-station paid business, that is to say, business between fixed points such as Victoria and Prince Rupert. The figures are as follows:—1910-11, 33,303 words, 1911-12, 69,721.

This increase is due to the fact that the reliability of our service is becoming more widely known among the mercantile houses, as we make no special effort to obtain such business except for the Queen Charlotte Islands, with which point the service is the only connecting link. Up to the present we have not entered into active competition with any land lines, the existing telegraph rates between any two points have been maintained, and it is left to the sender to route his messages as he may see fit.

It should be borne in mind that the wireless service is primarily intended for communication with ships at sea, as an aid to their navigation, and should the stations be loaded up to their capacity with inter-station business the real object of their maintenance would be defeated.

Cable interruptions are a source of considerable revenue for the service. Two breaks of importance occurred during the year, one on the United States Government Alaskan cable between Seattle and Alaska, the other on the cable between Prince Edward Island and the mainland. In the former case a large number of messages were handled via the Commercial Wireless Station at Ketchikan, Alaska, and our Prince Rupert station, and in the latter all the messages to and from Prince Edward Island were handled via the stations at Pictou and Cape Bear.

The above business was handled without difficulty and the utility of the wireless service thus further demonstrated.

It is gratifying to report that there have been no breakdowns or interruptions of communication between any of the wireless stations during the year.

The general shortage of telegraph operators throughout the country has also been felt in the service, and we have found it difficult at times to maintain a 24-hour watch at all of the stations; in fact, so acute has this shortage become on the Pacific Coast that we have been compelled to inaugurate a learners' division for the training of operators. The procedure adopted in this connection is as follows: An inexperienced man is attached to a station without salary until such time as he is capable of passing our 'Learners Examination,' which calls for a general elementary knowledge of the apparatus and organization, and an operating speed of 15 words per minute in the International Morse code.

A learner who has successfully passed this examination is then admitted to the 'Junior Operator' division at a salary of \$45 per month, and is regularly attached to a station to assist in its operation. He remains in this division until he has successfully passed the 'Third Operators' Examination,' which calls for a thorough knowledge of the adjustment of apparatus, organization, &c., and an operating speed of 20 words per minute; he then receives a permanent appointment.

By following the above general procedure, we shall in time develop a thoroughly trained and efficient staff of men who have been brought up in our service.

The Coast Stations continue to provide the public, free of charge, with weather and shipping reports three times a day. This information is given to any one on request, and is also published by the newspapers. We are assured that it is of the

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utmost value to the public and shipping interests to be constantly advised of the location of the vessels in which they are interested. The shipping reports include vessels sighted in addition to those communicated with by wireless.

The problem of the suppression of interference in connection with the Southern Stations of the West Coast service grows more serious year by year.

The direct cause of the augmentation of this interference is the ever increasing number of ship installations on vessels plying on the Pacific Coast and the erection of several additional coast stations on the shores of Puget Sound in the United States.

Little can be done to alleviate this very pressing difficulty until some regulations to govern the working of these coast stations are introduced by the United States. At present absolutely no control is exercised over their operation by that administration. A private arrangement has, however, been entered into by the different parties concerned, whereby the American government and Canadian government stations agree to operate only during the first 30 minutes of every hour, and the stations belonging to the commercial companies during the last 30 minutes of every hour.

This arrangement is satisfactory in so far as it goes, but is a makeshift at the best. The matter is patently one for international agreement, and a satisfactory solution can be arrived at by no other method.

It is with much pleasure that we hear that the United States proposes to signify its adherence to the International Radio-telegraphic convention at an early date.

The geographical position of the coast stations on the East Coast renders that service practically immune from interference by foreign stations; but the trouble we now encounter on the West Coast will be met on the Great Lakes immediately that service is placed in operation.

The difficulty is not insurmountable, it can be overcome to a great extent by accurate tuning, differentiation of wave lengths, and limitation of the power to be used at the individual stations concerned.

The interference which arises from experimental and amateur stations in the Dominion has been overcome by strict enforcement of the license clause in the Telegraphs Act, and by a judicious selection of the wave lengths and powers to be used at these stations.

It will be readily understood that any drastic suppression of such stations would be a great detriment to the advance of the art of wireless telegraphy in this country, but at the same time the coast station services must be kept free from interference at all costs.

This problem is also a technical one and resolves itself into a question of what wave lengths and powers these stations may use without interfering with a coast or ship station using the standard wave lengths of 300 and 600 metres. The matter has been carefully gone into and it has been found that a station using a wave length of 50 metres with a maximum power of $\frac{1}{2}$ K.W. does not interfere with ship to shore working, even if the experimental station is within a few hundred yards of the coast or ship station as the case may be.

With the above power and wave length the amateur stations have a range of about 15 miles. They are thus enabled to carry out any experiments they desire, and at the same time there is no interference except among themselves.

LICENSED STATIONS.

Under the provisions of the 'Telegraphs Act,' Chap. 126, R.S.C., Part IV of which deals with wireless telegraphy, no person may erect or operate a wireless telegraph station in the Dominion of Canada or on any vessel registered therein except under a license issued by the Minister of the Naval Service. In accordance with the Act the following licenses have been granted or renewed during the year:—

TRANSATLANTIC.

Glace Bay, C.B., 3,000 miles range; licensees, the Marconi Wireless Telegraph Company of Canada, Limited, Montreal.

PRIVATE STATIONS.

Toronto, Ont.: range, 50 miles; licensees, the Goodyear Tyre Rubber Co., Toronto.

Bowmanville, Ont.: range, 50 miles; licensees, the Goodyear Tyre and Rubber Co., Toronto.

Bowen Island, B.C.: range, 30 miles; licensees, Canadian Explosives Co., Montreal.

EXPERIMENTAL AND AMATEUR STATIONS.

Name.	Address.	Call Letters.
Elderkin, Karl O	Weymouth, N.S.	X A J.
Cuthbert David	Bamfield, B.C.	Reception only.
Lawson, Donald	Yarmouth, N.S.	X A I.
O'Hanley, Charles John	"	X A K.
Fowler, W. D	388 Roslyn Avenue, Montreal.	X A M.
Cooper, J. K.	Vancouver, B.C	X A L.
Lockyer, R. H. N	"	X A B.
Militia and Defence, Dept. of	Charlottetown, P.E.I.	X A N.
Teel, Jay G	170 Rielle Avenue, Verdun, P.Q.	X A P.
Vaughan, Frank P	St. John, N.B ..	X A O.
St. Aubin, A	67 Church St., Montreal.	X A C.

SHIP STATIONS.

Name of Ship.	Port of Registry.	Name of Owners.	Name of Company Operating the Station.
S.S. Assiniboia	Montreal, P.Q.	C.P.R.	Marconi Wireless Tel. Co. of Canada, Montreal.
" Alberta	"	"	" "
" Athabaska	"	"	" "
" Manitoba	"	"	" "
" Keewatin	"	"	" "
" Boston	Yarmouth, N.S.	"	" "
" Hamonic	Collingwood, Ont ...	Northern Nav. Co ..	" "
" Huronic	"	"	" "
" Germanic	"	"	" "
" James Whalen	Toronto, Ont.	Great Lakes Towing and Wrecking Co.	Owners.
Imperial	Sault Ste. Marie, Ont	" ..	Marconi Wireless Tel. Co. of Canada, Montreal.
Province	Port Arthur, Ont....	" ..	" "
Empire	"	" ..	" "
" Salvor	Victoria, B.C.	B.C. Salvage Co.	Owners.
" Prince Rupert	Newcastle, C.B.	G.T.P. Co	"
" " George	"	"	"
" " Albert	Prince Rupert, B.C.	"	"
" " John	"	"	"
" Florence	Toronto, Ont.	T. Eaton	"
" Princess Beatrice	Victoria, B.C.	C.P.R.	United Wireless Co., New York.
" " Charlotte	"	"	" "
" " May	Vancouver, B.C	"	" "
" " Royal	Victoria, B.C.	"	" "
" " Victoria	London, G.B.	"	" "
" " Tees	Victoria, B.C.	"	" "
" Camosun	Glasgow, G.B.	Union Steamship Co.	" "

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GOVERNMENT STEAMERS EQUIPPED WITH WIRELESS INSTALLATIONS.

OPERATED BY THE DEPARTMENT OF THE NAVAL SERVICE.

	Range.
H.M.C.S. <i>Niobe</i>	400 miles.
" <i>Rainbow</i>	250 "

OPERATED BY THE DEPARTMENT OF MARINE AND FISHERIES.

	Range.
C.G.S. <i>Quadra</i>	100 miles.
" <i>Minto</i>	150 "
" <i>Stanley</i>	150 "
" <i>Lady Laurier</i>	150 "
" <i>Aberdeen</i>	100 "
" <i>Druid</i>	100 "
" <i>Earl Grey</i>	200 "
" <i>Montcalm</i>	150 "
" <i>Montmagny</i>	200 "
" <i>Lady Grey</i>	100 "

NEW CONSTRUCTION—ADDITIONS AND ALTERATIONS.

EAST COAST.

Montreal Station.—The coast station at Montreal is situated on the Tarte Pier, Maisonneuve. During the year the Harbour Commissioners of the Port of Montreal decided to erect two sheds on this pier, and we were advised that the anchors of our mast were in the way of the foundations of these sheds. Six new concrete anchors were therefore installed by the Department and the existing ones removed. The position of the new anchors rendered it unsafe to maintain the mast at its existing height (185 ft.), the top gallant mast (45 ft. long) was therefore taken down.

The total cost of the above alterations was \$725.79.

GREAT LAKES.

The construction of a chain of stations on the Great Lakes to provide those waters with a wireless service is now proceeding. The station at Port Arthur has been purchased from the Marconi Wireless Telegraph Company of Canada by the Department, and work has been commenced on the erection of three new stations at Sault Ste. Marie, Ont., Tobermory, Ont., and Midland, Ontario, respectively. It is expected that these stations will be placed in operation by the opening of navigation, 1912.

Public tenders were called for the erection of the buildings and masts of these new stations and the apparatus has been ordered. The transmitters will be of $5\frac{1}{2}$ K.W. power, which will give the stations a daylight range of 350 miles over water.

3 GEORGE V., A. 1913

Both the transmitting and receiving apparatus will be installed in duplicate and each station will be equipped with two distinct units.

Where no local power is available each generator will be driven by an 8 h.p. gasoline engine, otherwise one engine only will be installed for use in cases of emergency, while for ordinary working each generator will be driven by a 3-phase motor taking its power from the local electrical supply. The installation of an engine in such cases is of great importance, for the storms which damage the power lines also render navigation dangerous, and it might happen that when the wireless service was most urgently needed no power would be available owing to a breakdown of the local lines.

Port Arthur.—The station at Port Arthur, Ont., was erected by the Marconi Wireless Telegraph Company of Canada in 1910, under an arrangement with the Department whereby the latter could purchase the same at any time, should they so desire. The policy of Government ownership of all wireless coast stations on the lakes has now been decided on, and in accordance with the same the above station has been transferred to the Department by the company for the sum of \$6,872.68.

Sault Ste. Marie, Ont.—A site of 4 acres was secured at Sault Ste. Marie on the high land to the east of the town, and public tenders were called for for the erection of the masts and buildings. The successful tenderers were Messrs. Pratt & Hanley, who submitted the lowest contract price, viz., \$15,250.

This work is now in progress.

Tobermory.—A site was secured at Tobermory, Ont., overlooking the easterly entrance of the harbour, and public tenders were called for for the erection of the buildings and masts. The successful tenderers were Messrs. Pratt & Hanley, who submitted the lowest contract price of \$15,100.

This work is now in progress.

Midland.—A site was secured at Midland on the hill overlooking the harbour, and public tenders were called for for the erection of the masts and buildings. The successful tenderers were Messrs. Pratt & Hanley, who submitted the lowest contract price of \$12,504.

This work is now in progress.

WEST COAST.

No new stations were installed on the west coast during the year. The following repairs and additions were made to the existing stations to maintain them at their proper standard of efficiency.

Cape Lazo.—A new 5½ K.W. transmitter in duplicate complete with two 8 h.p. gasoline engines was installed at Cape Lazo in the new operating house at a cost of \$4,489.85. The old 1 K.W. set at this point was transferred to Point Grey.

The new apparatus is of the most modern type and has done excellent work.

Public tenders were called for for the erection of a dwelling house to accommodate the additional staff rendered necessary by the 24-hour service. The successful tenderer was James Carthew, Comox, B.C., who submitted the lowest contract price of \$3,600.

This work is still in progress.

Ikeda Head.—An aerial tramway 500 ft. long was installed at Ikeda Head station for the transportation of supplies, &c., from the shore to the station. Repairs were also made to the telephone line and trail between Ikeda and Jedway. The cost of this work was \$813.77.

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SHIPPING DISASTERS AND THE WIRELESS SERVICES.

Practically no serious maritime disasters occurred during the year and the service has therefore had little opportunity of showing its value in cases of emergency.

• WEST COAST.

On November 23, 1911, the S.S. *Tees* lost her propeller while backing from the wharf at Claypits, at the head of Kyuquoit Sound, on the west coast of Vancouver Island. No further damage was done nor was the safety of the vessel or passengers imperilled.

Distress signals were sent out by the *Tees*, but owing to her location at the head of the Sound, entirely surrounded by high mountains of the order of 7,000 feet, she was unable to establish communication with any station. The peculiar condition of the ether at night time on the Pacific coast, however, assisted her, and although she was unable to get an answer to her calls, they were heard by the steamer *Northwestern* away up in Alaska, and the news was relayed by her down to Victoria. At the same time the Government Station at Estevan received a piece of a message from the *Tees* saying she was in Kyuquoit Sound. Nothing more was received from the *Tees* until assistance arrived at the scene of the accident five days later, and it was feared a serious disaster had occurred.

On receipt of the above very meagre news several ships immediately went to her assistance, but owing to bad weather and fog they were unable to get into the Sound—a very dangerous spot in any weather—for four days. These steamers were in constant communication with the Government Coast Station Service, but could get no reply from the *Tees*.

On the fifth day the fishery protection cruiser, *William Joliffe*, of the Department of the Naval Service picked up the life boat of the *Tees* at the entrance to the Sound, when the news that all was well with the steamer was immediately transmitted to Victoria by her and much anxiety allayed. The *Tees* was eventually towed to Victoria by the Canadian Pacific Railway tug *Nanoose*.

At 2.30 a.m., December 17, 1911, the Pacific Coast S.S. *City of Pueblo*, while on her way from Seattle to Vancouver, blew out a cylinder head, disabling the ship and severely scalding the chief engineer.

The distress signal was immediately sent out, Victoria and Point Grey stations responding.

The captain advised his owners through these stations of the disaster, requesting immediate assistance.

Several messages were exchanged between the disabled vessel and Point Grey station, the latter station having a land wire communication with Seattle, the land line office connecting Victoria station being closed.

It is worthy of note to remark that Victoria and Point Grey were the only stations to respond, these stations keeping a 24-hour watch.

The position of the boat and the dangerous condition of the injured engineer made it imperative to have prompt assistance.

The *City of Puebla* was one of the first vessels on the Pacific coast to instal wireless.

3 GEORGE V., A. 1913

EAST COAST.

On July 30, I.L.M.C.S. *Niobe* ran ashore on the southwest ledges near Cape Sable, N.S. Communication was immediately established with Camperdown station (Halifax), and the Marine and Fisheries and Naval Dockyard officials at that point were at once advised of the accident. Assistance was sent and the cruiser was floated later in the day. She was eventually towed to Halifax where she underwent repairs.

From the moment the *Niobe* struck until the time she reached Halifax she was never out of communication with the Coast Station System, and the advantage of direct and instant communication with the assisting ships (all of which were equipped with wireless) proved invaluable during the salvage operations and the tow to Halifax.

On September 24, 1911 a wireless telegram was received from the *Reina Maria Cristina* by the Sable Island and Halifax stations reporting a smack half submerged, with three fore sails stretched, named *Stephen G. Hart*, of New London, and flying the American flag, in the position of lat. 16° north, long. $68^{\circ} 33'$ west. It was impossible to render any assistance to this vessel, but the Marine and Fisheries Department of the Canadian Government and the Hydrographic Office at Washington were both advised so that all steamers interested might be warned of this menace to shipping.

On November 6, 1911, at 6 a.m., distress signals were received by the Sable Island station from the British steamer *Berwind-Moor*, owned by the Berwind-Moor Steamship Company, Liverpool. The steamer gave her name and position and advised that she was disabled.

Great difficulty was experienced by the Sable Island station in communicating with this vessel, possibly owing to the fact that no regular wireless telegraph operator was employed on the steamer, this work being attended to by one of the navigating officers. The steamer was not badly disabled and while in the open sea did not particularly require any assistance. All steamers in the vicinity, however, were advised of her position and condition by the Sable Island station.

A German tank steamer eventually went to her assistance and towed her to Halifax. Several accidents, such as parting of cables, occurred during the tow and bad weather was encountered during the whole voyage; several vessels put out from Halifax to assist the disabled steamer into port, at which point she finally arrived in safety on November 30, 1911.

The owners and the public were in touch with the disabled vessel and were kept constantly advised with regard to her condition and the progress she was making.

On February 25, 1912, the steamer *Volturmo* reported having sighted a wooden ship turned bottom up in lat. $40^{\circ} 37'$ north $59^{\circ} 20'$ west.

No assistance was rendered in this case, but the Marine and Fisheries Department of the Canadian Government and the Hydrographic Office at Washington were both advised so that all steamers interested might be warned of this menace to navigation. All passing steamers fitted with wireless telegraphy were also advised by the Sable Island Station.

THE INTERNATIONAL RADIO-TELEGRAPHIC CONVENTION.

By 1903 the increasing use of wireless telegraphy for maritime purposes had raised questions of international interest and it became evident that on many points, regarding the interchange of messages, international agreement was urgently required.

The first or preliminary conference was held at Berlin in 1903, when a protocol was drawn up as a basis for discussion at a future conference.

The second conference met at Berlin in 1906, and is known as the 'Berlin Conference.' The provisions of this convention have been ratified by Great Britain and all the self-governing colonies, with the exception of Newfoundland, and by all the leading nations of the world with the exception of the United States.

The primary object of the convention is to facilitate ship-to-shore communication, and its main provisions may be classified generally as follows:—

The acceptance and transmission of telegrams.

The adoption of uniform rules of working.

The provision of the means of collecting charges and settling accounts between the different countries.

Arrangements for the publication of all information necessary for intercommunication.

Rules to prevent interference and confusion in working, with adequate provision for their enforcement.

Compulsory intercommunication with certain exceptions.

The convention provides for the establishment of an International Bureau for the distribution of information, and its regulations cover:—the control of operators; the limitation of power; the efficiency of apparatus; the use of specific wave lengths; the adoption of uniform methods for the operation of stations and the handling of messages. It imposes a general obligation on the part of all stations not to interfere, and calls for compulsory intercommunication between ship and shore stations, irrespective of the system of wireless telegraphy employed.

It was proposed to hold the next convention at London last year (1911), but owing to the coronation taking place in June it has been decided to postpone it until 1912.

Many of the regulations contained in the 'Berlin Convention' require amendment to meet present-day requirements, and it is anticipated there will be considerable discussion regarding the different clauses before a satisfactory solution is arrived at.

Generally speaking, the 'Berlin Convention' has proved successful, and it has undoubtedly done much to alleviate the many difficulties encountered in the operation of a Radio-telegraphic service.

I have the honour to be, sir,

Your obedient servant,

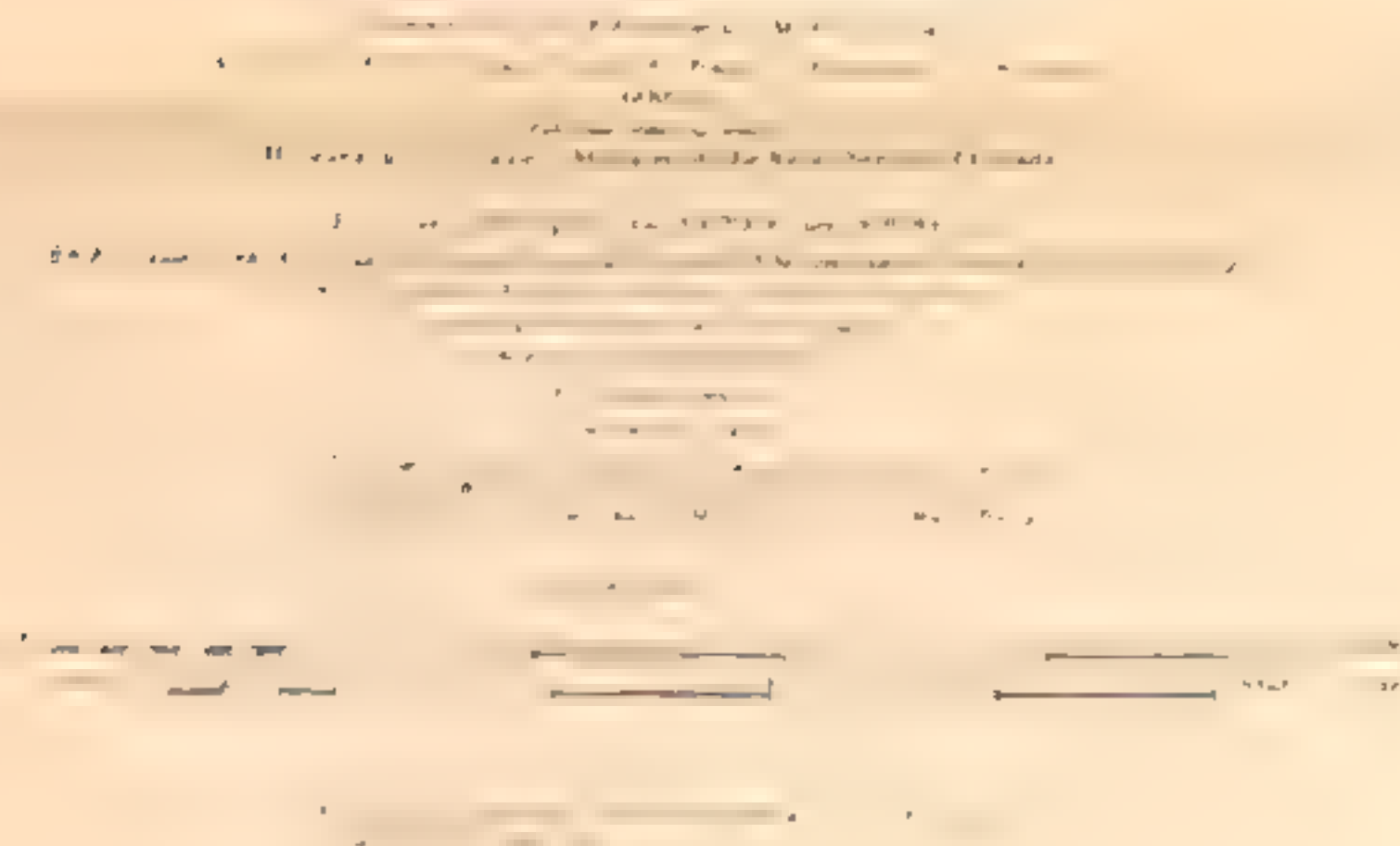
C. P. EDWARDS,

General Superintendent, Government Radiotelegraphs.

CANADA
TO BRITAIN, IRELAND
NELSON ROADS

1. The first of the Nelson Roads is the road from the
2. second of the Nelson Roads is the road from the
3. third of the Nelson Roads is the road from the
4. fourth of the Nelson Roads is the road from the
5. fifth of the Nelson Roads is the road from the
6. sixth of the Nelson Roads is the road from the
7. seventh of the Nelson Roads is the road from the
8. eighth of the Nelson Roads is the road from the
9. ninth of the Nelson Roads is the road from the
10. tenth of the Nelson Roads is the road from the

ANALYSIS
OF THE
NELSON ROADS



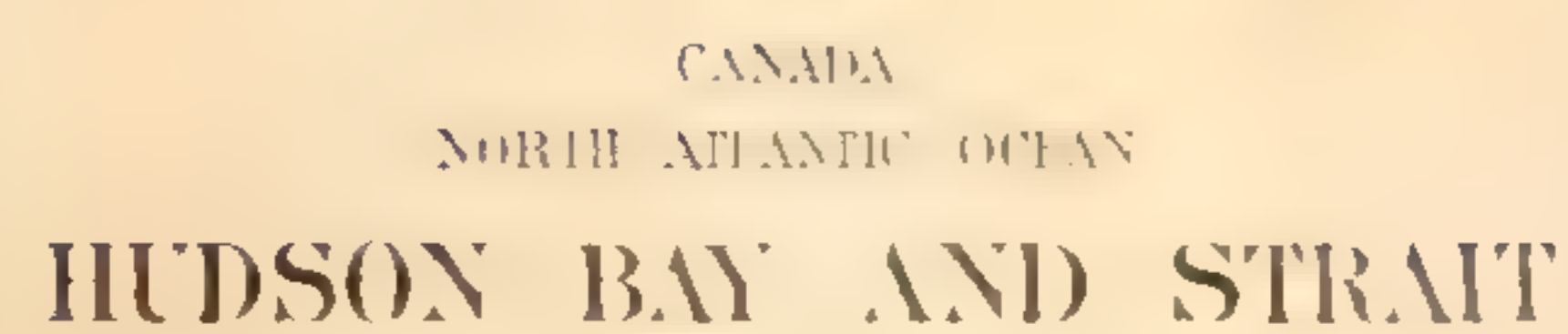
DEPARTMENT OF THE NAVAL SERVICE
OF
CANADA
CHART OF RADIO-TELEGRAPH COAST STATIONS
ON THE GREAT LAKES

V.M. indicates in name shows range in miles
M. indicates in name shows range in miles

NOTE
A light in name shows range in miles
A light in name shows range in miles







during her return trip to Port Nelson

1711

CAPITAIN F. GUYOT-SOHN

the \mathbb{R}^n is m and n is the dimension of the space.

See also: Digital marketing

into the ...

Honorable Louis P. Brodeur, Minister of the Naval Services Canada

C. P. Bestuzhev-Bezdelyan, Moscow

1945-1946

POSTER

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11. 10. 80. А. В. 10. 80.

103 102 101 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200



CANADA
NORTH ATLANTIC OCEAN
HUDSON BAY AND STRAIT

*Showing the path followed and the ice encountered
by the H.S.S. Minto during her trip to Fort Nelson*

1911
Captain F. A. Anderson,
H.S.S. Minto

Scale of Miles
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

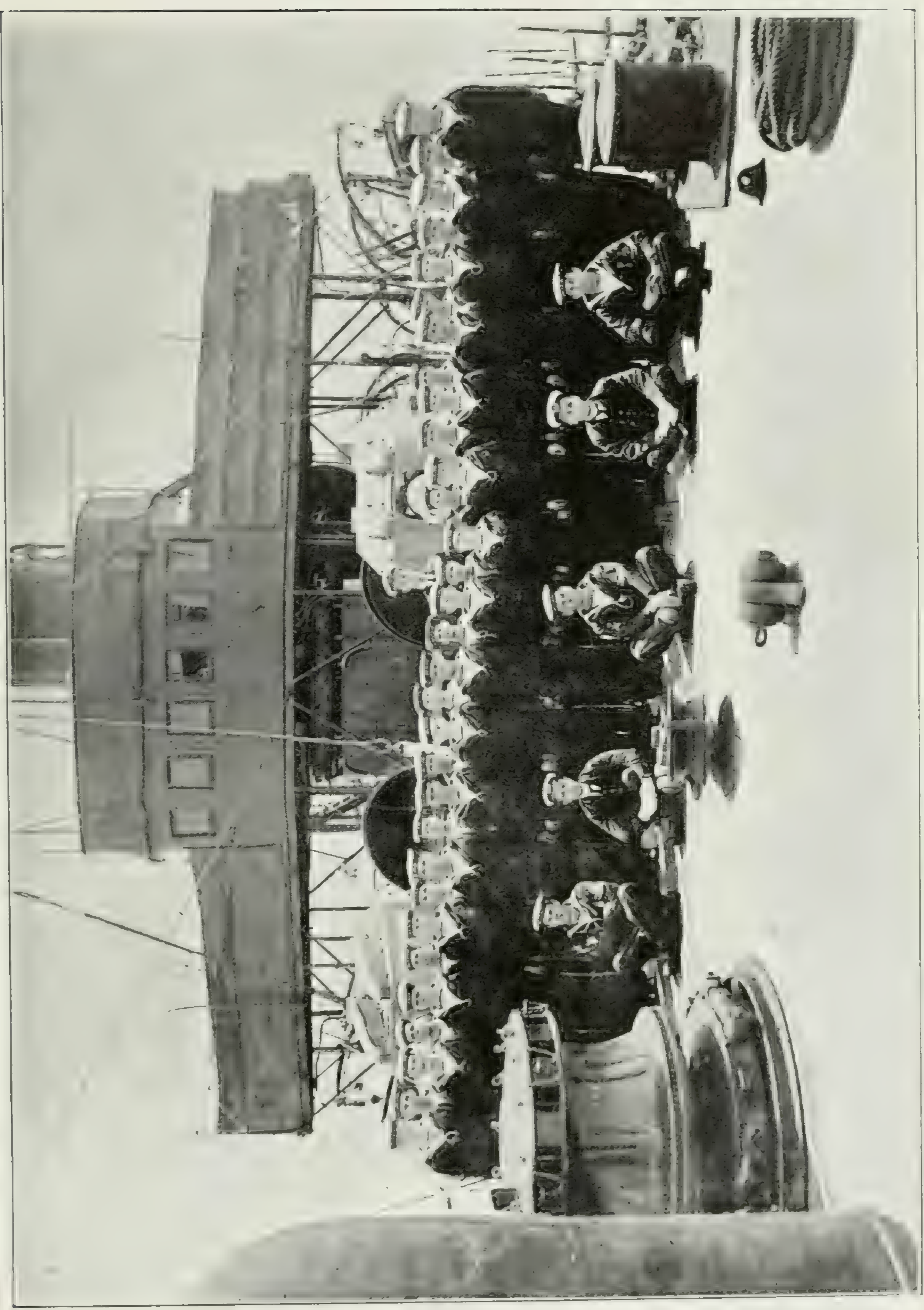
Printed by James P. Broderick, Minister of the Navy,
Ottawa, Canada

Published by the
Department of the Navy,
Ottawa, Canada
1911

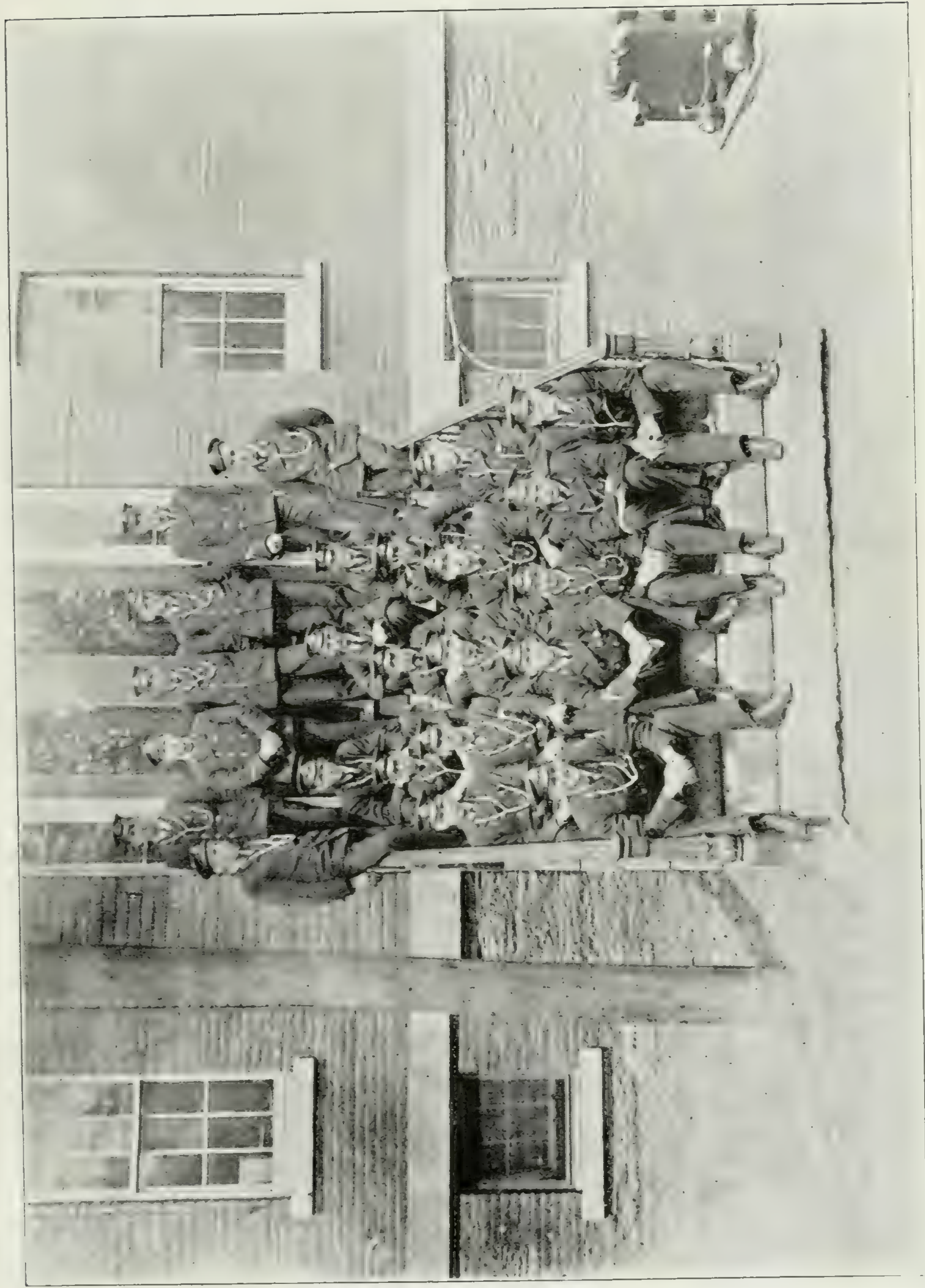




French Canadian Officers and Recruits.



The Coronation Contingent.



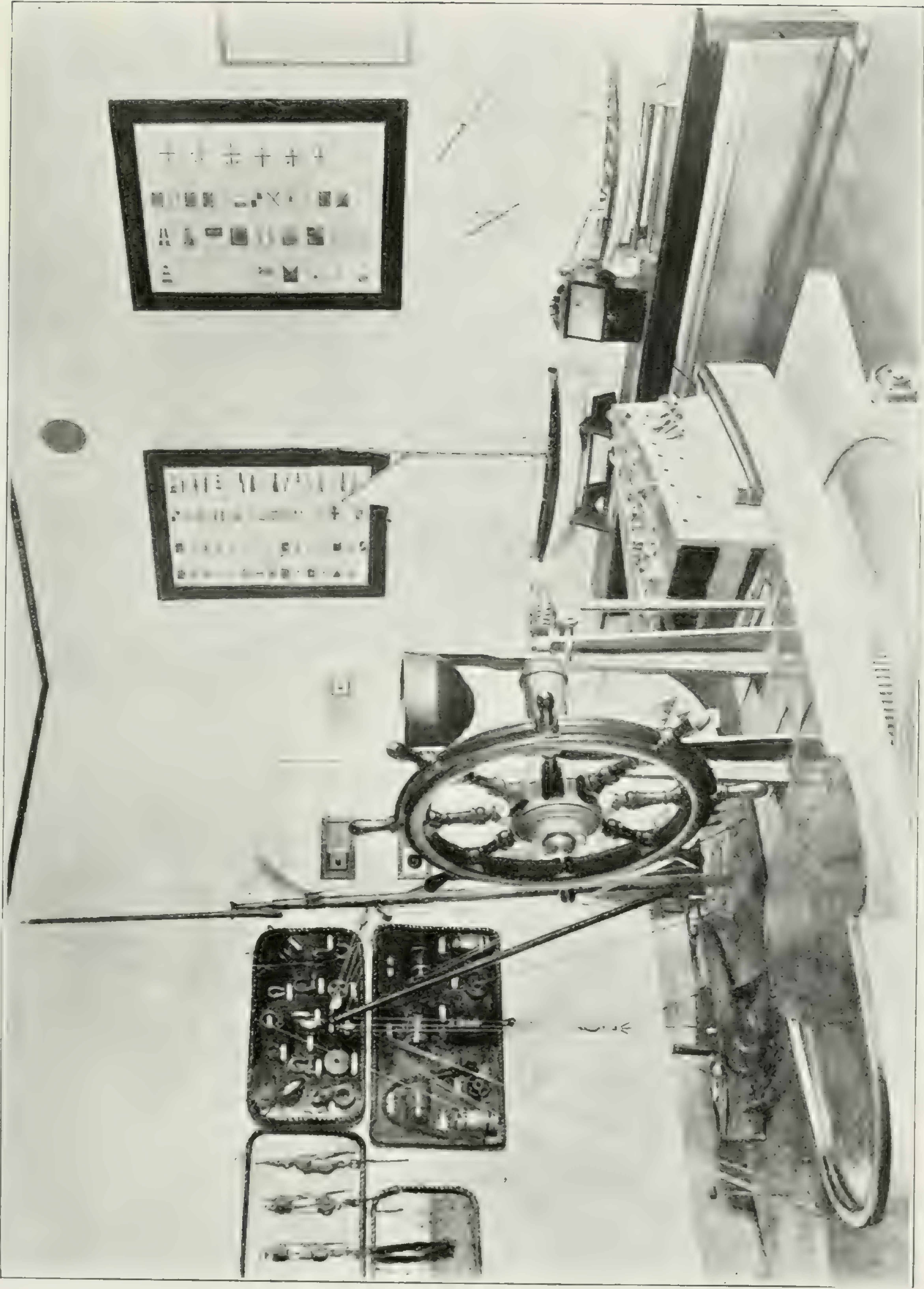
Cadets at R.N. College.



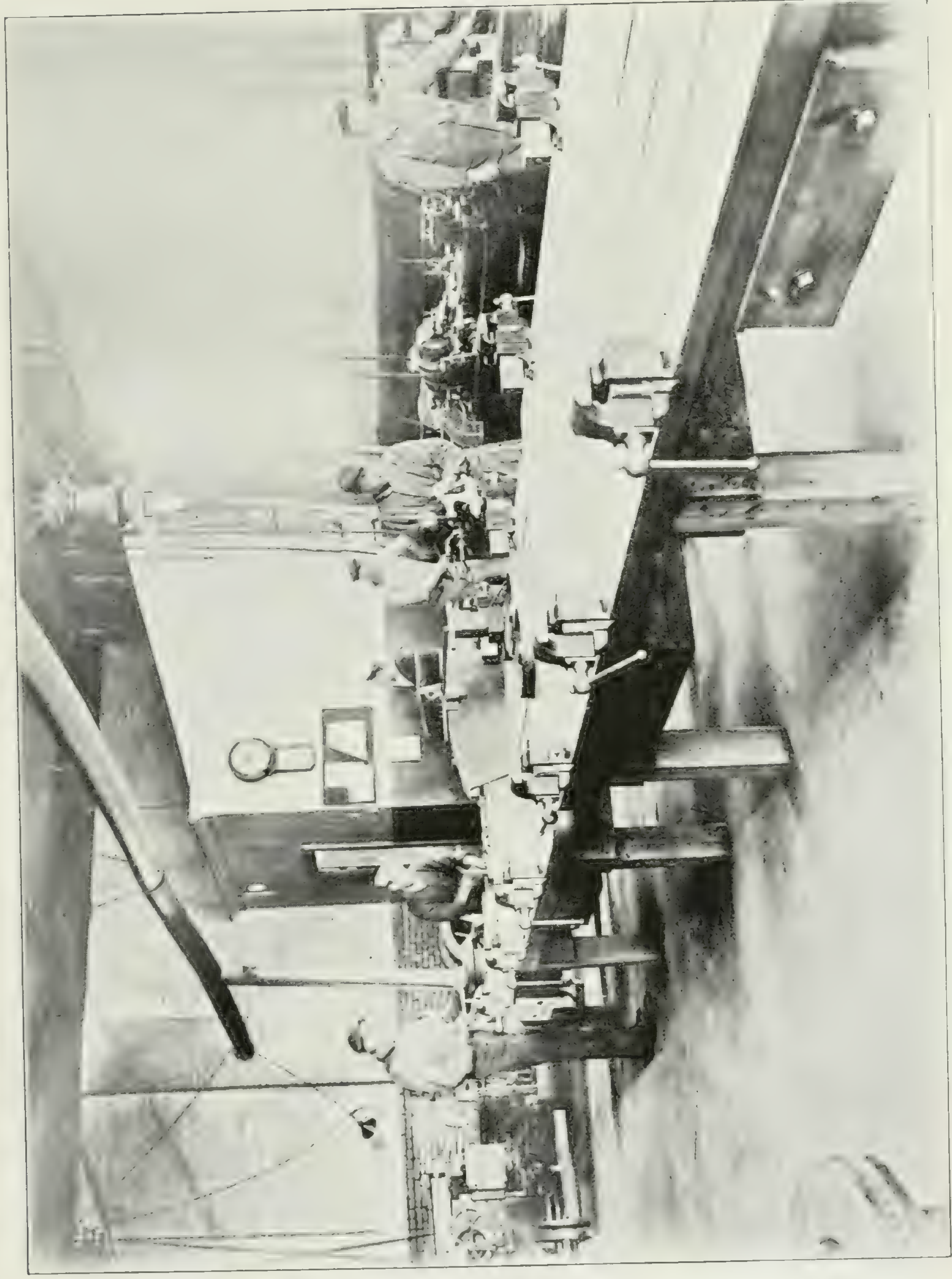
Recruits on joining.



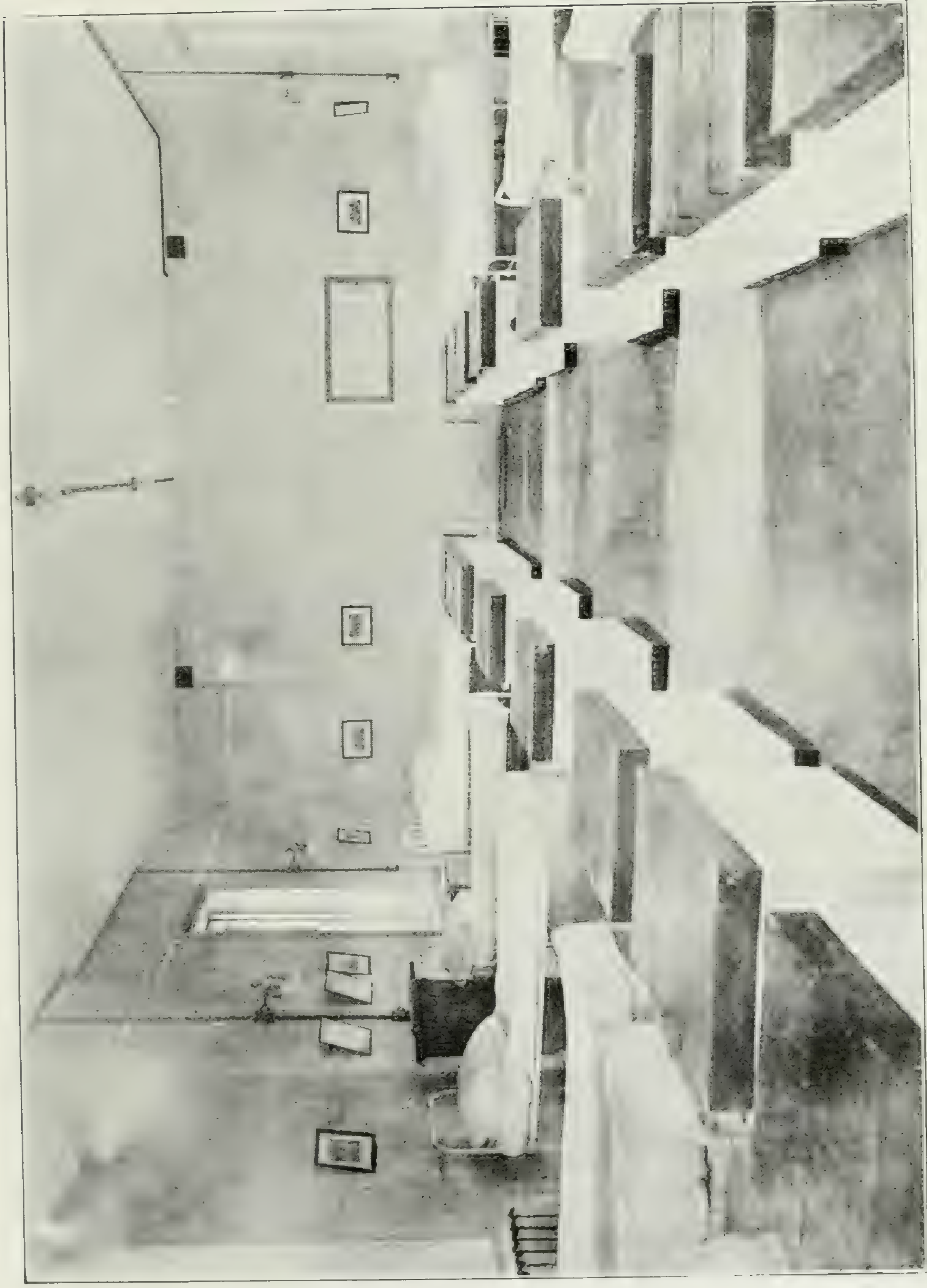
Same recruits after one month.



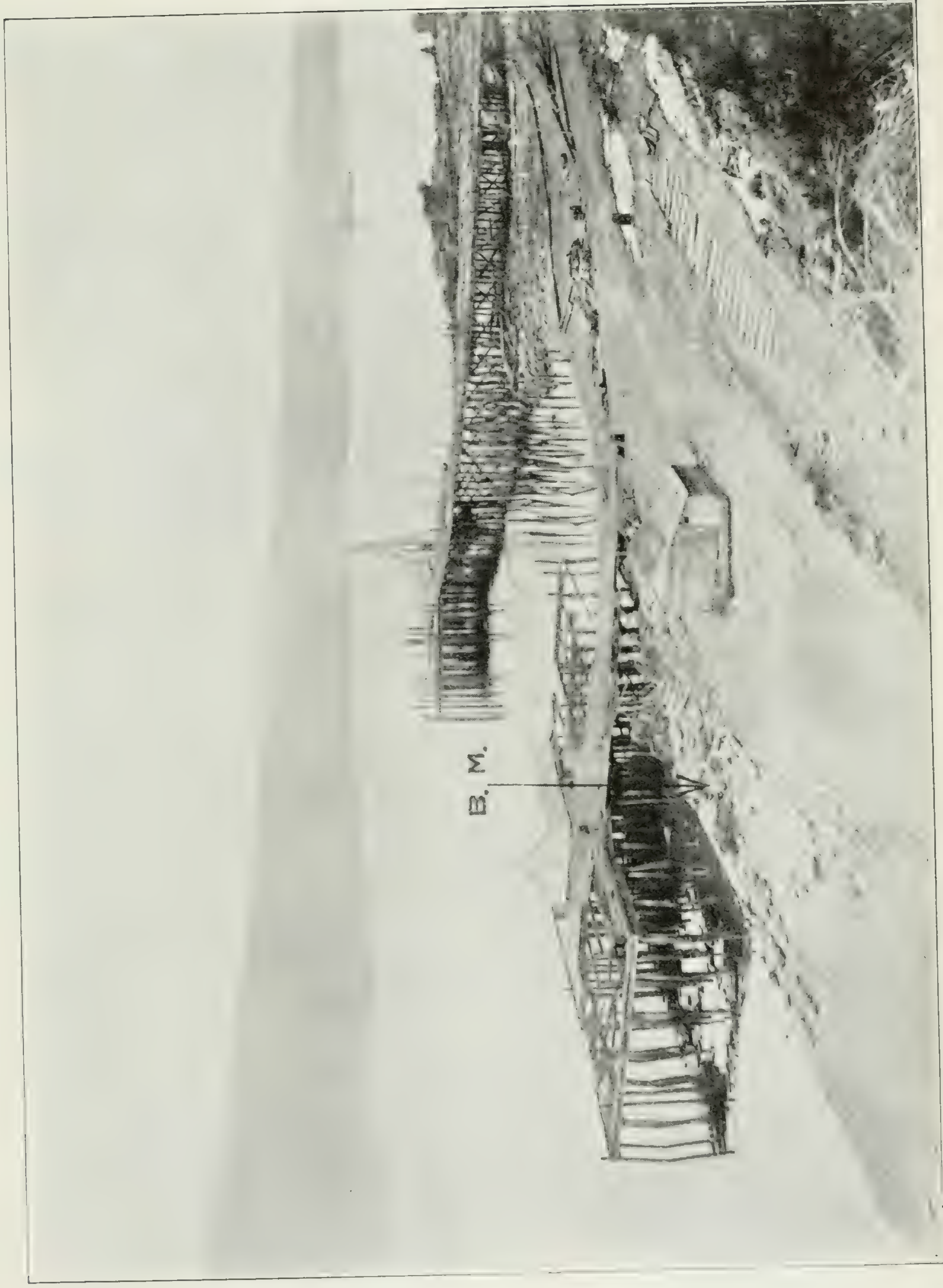
Model Room at R.N. College.



Cadets Workshop, R.N. College.



Dormitory at R.N. College.



A BENCH MARK IN THE ROCK.
(At a prospective Railway Station Terminus, Albemarle, B.C.) The extreme levels of the tide are referred permanently to this mark.



Marsh Point, Nelson Roads, Hudson Bay at Low Tide.



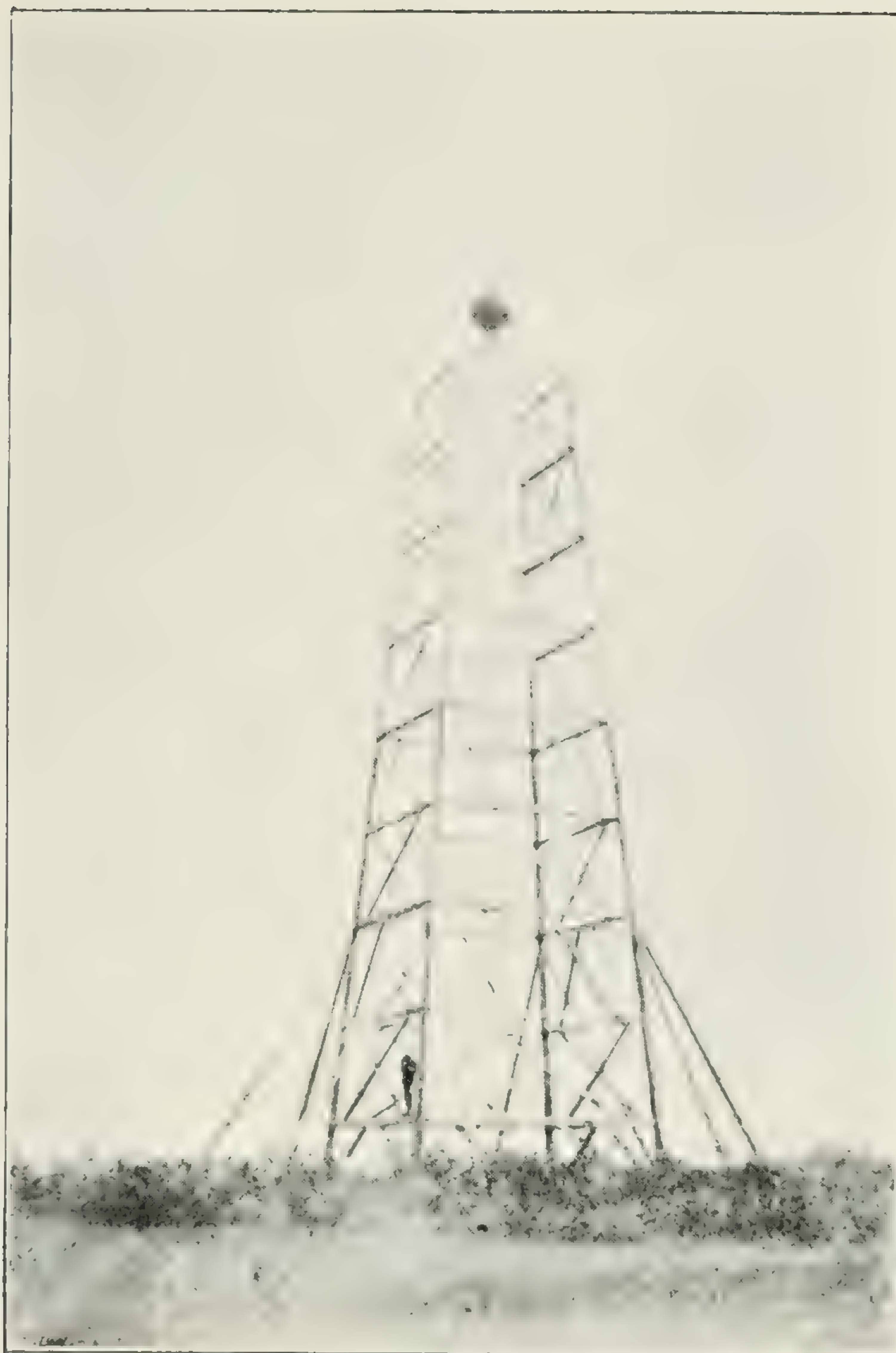
The Schooners "Burleigh" and "Chrissie Thomey" in Hudson Straits, 28th July 1911.



The R.N.W.M.P. Landing at Port Churchill Harbour, Hudson Bay.



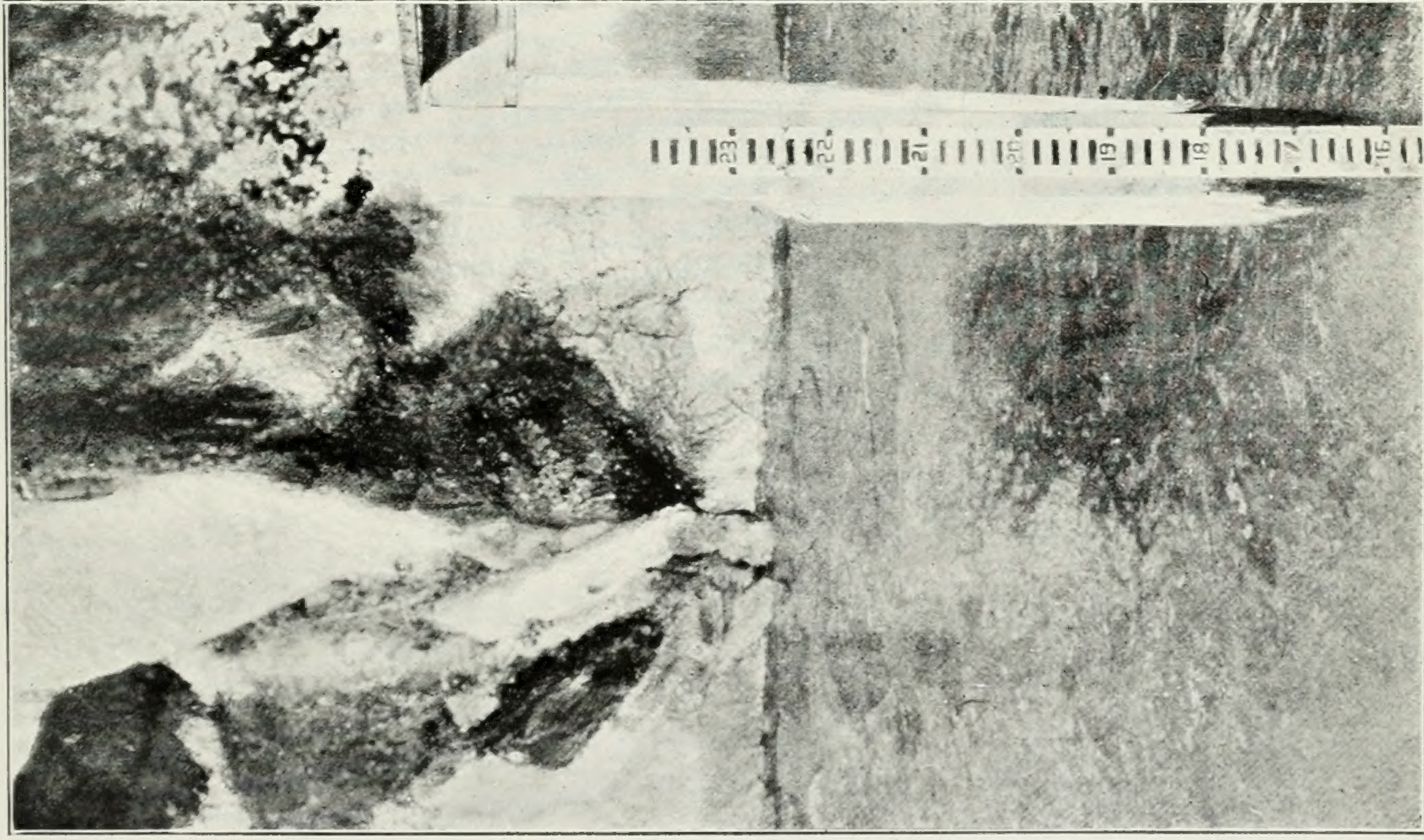
Transferring the Missionaries from C.G.S. "Minto" to the "Burleigh", in Hudson Straits, on 28th July 1911.



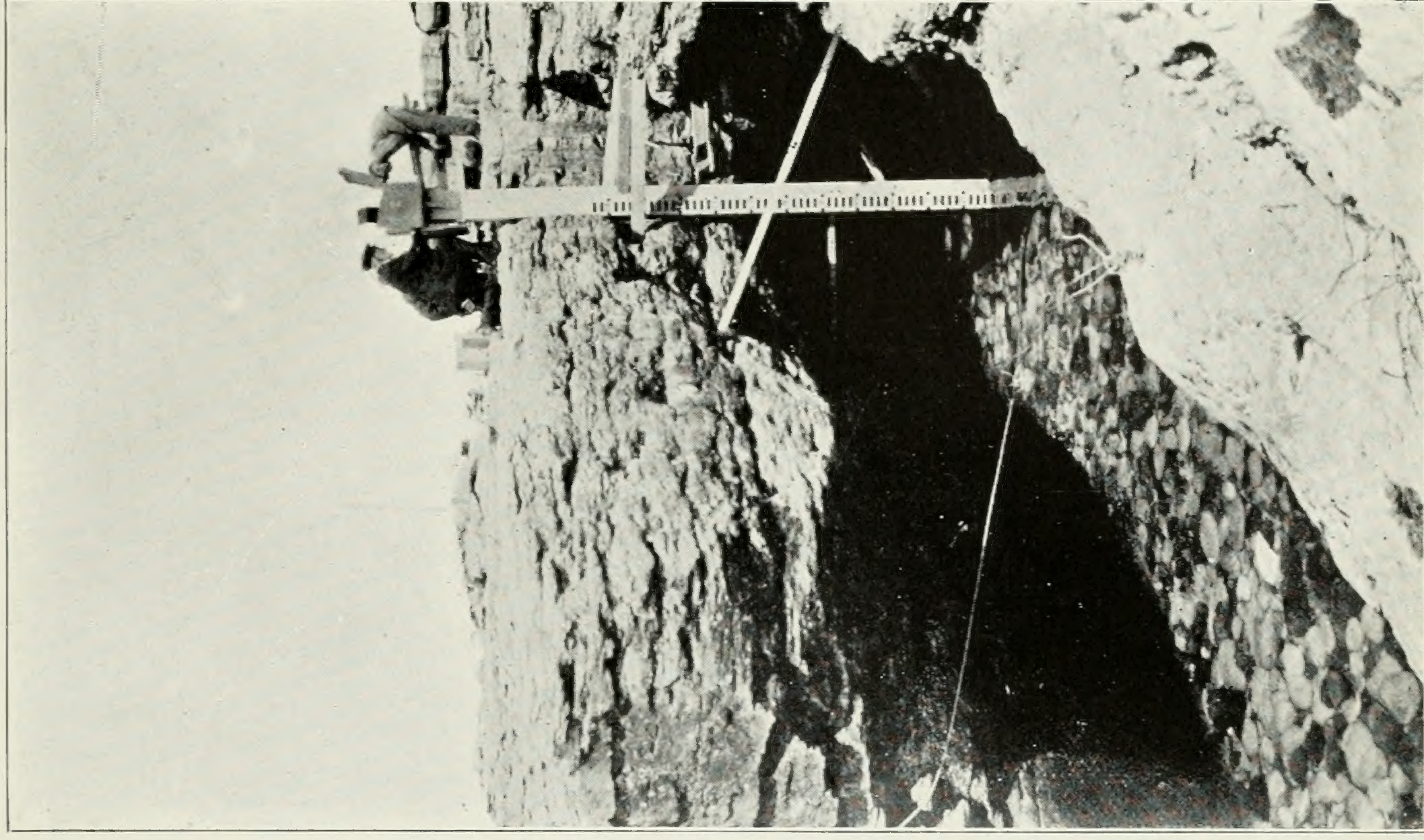
The Beacon at March Point, Nelson Roads, Hudson Bay.



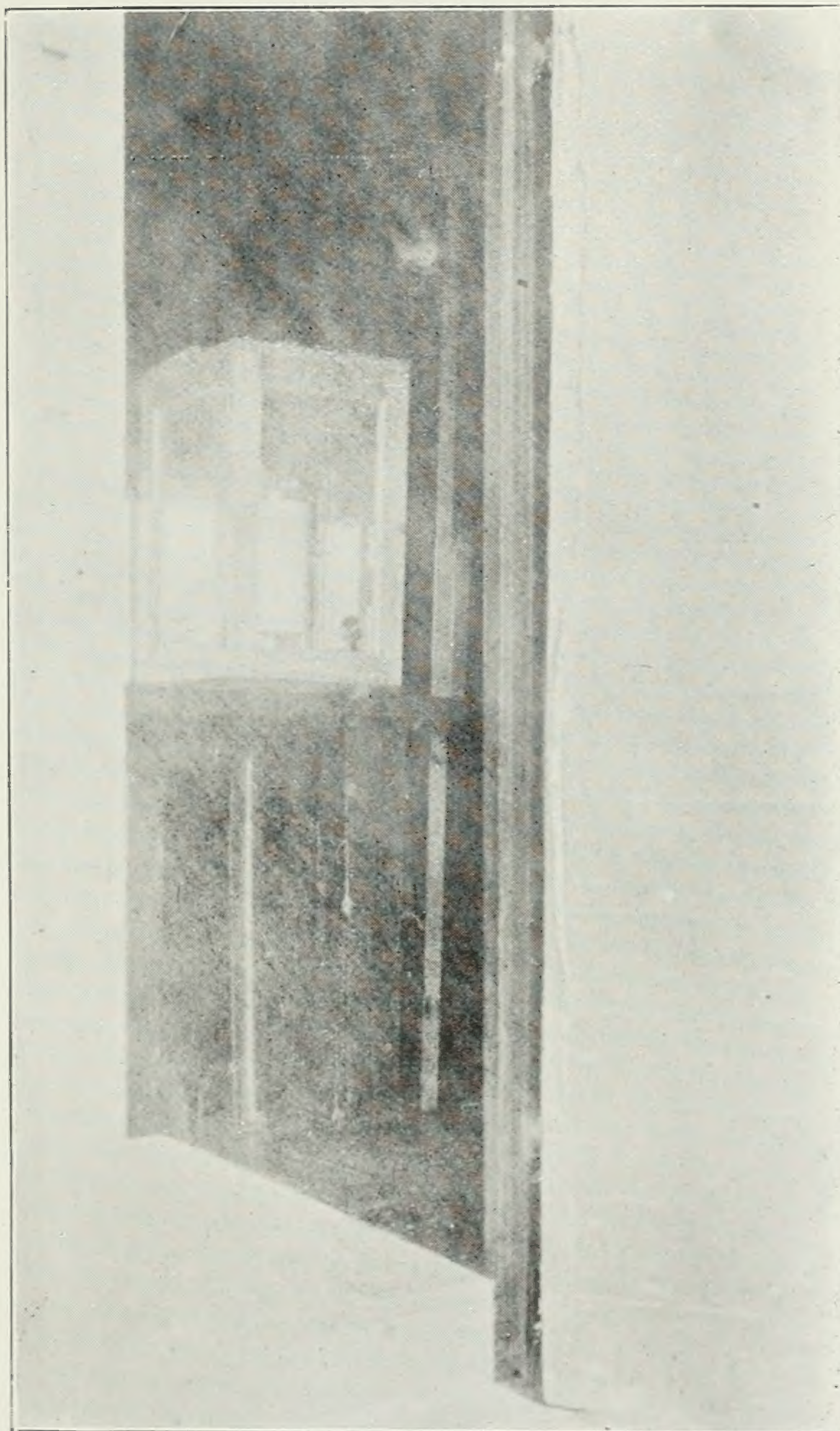
York Factory—Hudson Bay.



The Standard Tide Scale. The Registering Instrument is set to correspond with this.



A Temporary Tide-guage. Showing Tide Column braced from the rock and guyed with wire rope. (At South West Point, Anticosti).



A Winter Station. Showing a registering tide guage and graduated staff which rises and falls with the tide. (In Belle Isle Strait).

